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(Also referred to as FORM PTO-1465)

### REQUEST FOR *EX PARTE* REEXAMINATION TRANSMITTAL FORM

Address to:  
MS Ex Parte Reexam  
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P.O. Box 1450  
Alexandria, VA 22313-1450

Attorney Docket No.: 454030000041

6466U U.S. P.T.O.  
90007750

Date: October 17, 2005

10/17/05

1.  This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 6,233,389 issued May 15, 2001. The request is made by:
- patent owner.  third party requester.
2.  The name and address of the party requesting reexamination is:
- ECHOSTAR COMMUNICATIONS CORPORATION  
9601 S. Meridian Boulevard  
Englewood, Colorado 80112
3.  a. A check in the amount of \$ \_\_\_\_\_ is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1).  
 b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. 03-1952 (submit duplicative copy for fee processing); or  
 c. Payment by credit card. Form PTO-2038 is attached.
4.  Any refund should be made by  check or  credit to Deposit Account No. 03-1952.  
37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.
5.  A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4)
6.  CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table  
 Landscape Table on CD
7.  Nucleotide and/or Amino Acid Sequence Submission  
*If applicable, items a. - c. are required.*
- a.  Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
- i.  CD-ROM (2 copies) or CD-R (2 copies); or
- ii.  paper
- c.  Statements verifying identity of above copies
8.  A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.
9.  Reexamination of claim(s) 1, 6, 20, 21, 23, 32, 37, 51, 52 is requested.
10.  A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.
11.  An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EV701013945US, in an envelope addressed to MS Ex Parte Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below.  
Dated: October 17, 2005

Signature:  (Marco Jimenez)

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

12.  The attached detailed request includes at least the following items:

- a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1)
- b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2)

13.  A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e)

14.  a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).  
 The name and address of the party served and the date of service are:

KIRK WONG, ESQ.  
 HICKMAN PALERMO TRUONG & BECKER, LLP  
 2055 GATEWAY PLACE, SUITE 550  
 SAN JOSE, CA 95110

b. Date of Service: October 17, 2005 ; or  
 A duplicate copy is enclosed since service on patent owner was not possible.

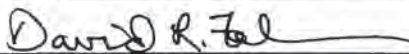
15. Correspondence Address: Direct all communication about the reexamination to:

The address associated with Customer Number:  OR

|  |   |           |                |       |                   |
|--|---|-----------|----------------|-------|-------------------|
| <input type="checkbox"/> Firm or Individual Name | David L. Fehrman<br>MORRISON & FOERSTER LLP |           |                |       |                   |
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| City   | Los Angeles                                 | State     | California     | Zip   | 90013             |
| Country  | US  | Telephone | (213) 892-5601 | Email | DFehrman@mofo.com |

16.  The patent is currently the subject of the following concurrent proceeding(s):

- a. Copending reissue Application No. \_\_\_\_\_
- b. Copending reexamination Control No. \_\_\_\_\_
- c. Copending Interference No. \_\_\_\_\_
- d. Copending litigation styled:  
*Tivo, Inc. v. EchoStar Communications Corp., et al.*, Case No. 2-04cv01 DF,  
 U.S. District Court for the Eastern District of Texas (Marshall Division)

  
 \_\_\_\_\_  
 Authorized Signature

David L. Fehrman  
 \_\_\_\_\_  
 Typed/Printed Name

\_\_\_\_\_ October 17, 2005 \_\_\_\_\_  
 Date

\_\_\_\_\_ 28,600 \_\_\_\_\_  
 Registration No., if applicable

For Patent Owner Requester

For Third Party Requester

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EV 644664827 US, in an envelope addressed to: MS Ex Parte Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below.

Dated: October 17, 2005

Signature:

(Marco Jimenez)

Attorney Docket No. 454030000041  
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reexamination of:  
James M. BARTON, et al.

Patent No.: 6,233,389

Group Art Unit: Not Yet Assigned

Issue Date: May 15, 2001

Examiner: Not Yet Assigned

For: MULTIMEDIA TIME WARPING SYSTEM

**DETAILED REQUEST FOR EX PARTE REEXAMINATION**

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ATTACHED EXHIBITS

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| Exhibit 2 .....  | U.S. Patent No. 5,614,940 to Cobbley et al.   |
| Exhibit 3 .....  | U.S. Patent No. 6,304,714 to Krause et al.  |
| Exhibit 4 .....  | U.S. Patent No. 5,949,948 to Krause et al.  |
| Exhibit 5 .....  | U.S. Patent No. 6,226,447 to Sasaki et al.  |
| Exhibit 6 .....  | U.S. Patent No. 5,899,578 to Yanagihara et al.  |
| Exhibit 7 .....  | U.S. Patent No. 6,167,083 to Sporer et al.  |
| Exhibit 8 .....  | U.S. Patent No. 5,577,190 to Peters   |
| Exhibit 9 .....  | U.S. Patent No. 6,169,843 to Lenihan et al.   |
| Exhibit 10 ..... | Claim Charts based on Cobbley, Krause '714 and Krause '948  |
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| Exhibit 12 ..... | Claim Construction Order dated August 18, 2005  |
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| Exhibit 14 ..... | Deposition Testimony of Dr. Storer (pp. 1-8, 113-120, 420-431, 584-599)   |
| Exhibit 15 ..... | International Standard ISO/IEC 11172 (MPEG-1 Standard, Part 1: Systems)   |
| Exhibit 16 ..... | Collected Articles Concerning MPEG Parsing/Indexing:<br><br>K. Shen et al., <i>A fast algorithm for video parsing using MPEG compressed sequences</i> , IEEE, pp. 252-255 (0-8185-7310-9/959/1995).<br><br>S. Smollar et al., <i>Content-based video indexing and retrieval</i> , IEEE, Summer 1994, pp. 62-72.<br><br>J. Meng et al., <i>CVEPS-A compressed video editing and parsing system</i> , ACM Multimedia '96, Boston MA, pp. 43-53 (ACM 0-89791-671-1/96/1).<br><br>H. Zhang et al., <i>Video parsing, retrieval and browsing: an integrated and content-based solution</i> , ACM Multimedia 95-Electronic Proceedings (Nov. 5-9, 1995, San Francisco, CA). |

## INTRODUCTORY COMMENTS

EchoStar Communications Corporation (“EchoStar”) is requesting reexamination of U.S. Patent No. 6,233,389 (“the ‘389 Patent”) under 35 U.S.C. §§ 302-307 and 37 C.F.R. § 1.510. The ‘389 Patent issued on May 15, 2001. TiVo Inc. (“TiVo”) is the assignee of the ‘389 Patent.

The ‘389 Patent is currently the subject of a co-pending litigation styled *TiVo Inc. v. EchoStar Communications Corp., et al.*, Case No. 2-04cv01 DF, before the United States District Court for the Eastern District of Texas (Marshall Division). In this litigation, TiVo asserts that certain products and services provided by EchoStar infringe certain claims of the ‘389 Patent.

During the course of the co-pending litigation, EchoStar became aware of many U.S. patents that were neither submitted by TiVo nor cited by the Examiner during prosecution of the ‘389 Patent. EchoStar believes that at least three of these U.S. patents raise substantial new questions of patentability for at least claims 1, 6, 20, 21, 23, 32, 37, 51 and 52 of the ‘389 Patent.

The patentability of these claims is in question particularly in view of TiVo’s interpretation of the claims in the co-pending litigation. To support its assertion of infringement, TiVo has argued that certain claim terms, discussed below, should be “broadly” construed in a manner that EchoStar believes is incorrect. TiVo’s position is important to the reexamination, because it establishes what TiVo – the patent owner – views as a reasonable interpretation of the asserted claims. EchoStar considers TiVo’s interpretation of the asserted claims to be unreasonable. However, assuming that these claims are given the scope in reexamination that TiVo asserts in the co-pending litigation, EchoStar respectfully submits that claims 1, 6, 20, 21, 23, 32, 37, 51 and 52 are anticipated by or obvious in view of at least three U.S. patents. An order for reexamination of these claims should accordingly be issued.

Alternatively, if the Examiner believes that TiVo's interpretation of the asserted claims is unreasonable and that there is no substantial question of patentability in view of a more proper claim construction, EchoStar respectfully requests that the Examiner set forth his or her conclusions as to the unreasonableness of TiVo's claim construction.

### **CLAIMS FOR WHICH REEXAMINATION IS REQUESTED**

This request for reexamination raises the following substantial new questions of patentability with respect to the '389 Patent (attached as Exhibit 1).

Claims 1, 6, 20, 21, 23, 32, 37, 51 and 52 are anticipated under 35 U.S.C. § 102(a) or 102(b) by U.S. Patent No. 5,614,940 to Cobbley et al. (attached as Exhibit 2).

Claims 1, 6, 20, 21, 23, 32, 37, 51 and 52 are obvious under 35 U.S.C. § 103(a) in view of U.S. Patent No. 6,304,714 to Krause et al. (attached as Exhibit 3) and U.S. Patent No. 5,949,948 to Krause et al. (attached as Exhibit 4).

A detailed explanation for each of these substantial new questions of patentability is presented below and in corresponding claim charts attached as Exhibit 10.

Aside from Cobbley, Krause '714 and Krause '948, it is believed that all of the claims for which reexamination is requested are anticipated by or obvious in view of a number of other references. Examples of these other references include: U.S. Patent No. 6,226,447 to Sasaki et al. (attached as Exhibit 5), U.S. Patent No. 5,899,578 to Yanagihara et al. (attached as Exhibit 6), U.S. Patent No. 6,167,803 to Sporer et al. (attached as Exhibit 7), U.S. Patent No. 5,577,190 to Peters (attached as Exhibit 8) and U.S. Patent No. 6,169,843 to Lenihan et al. (attached as Exhibit 9).

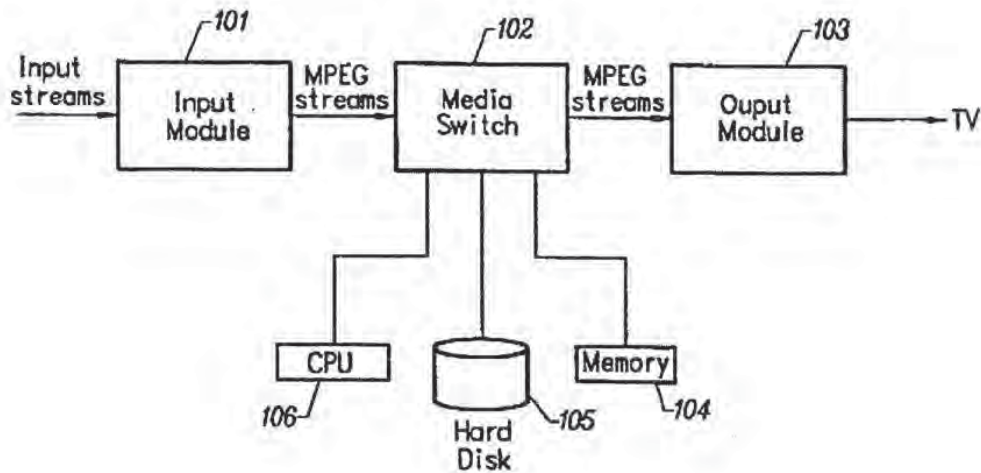
EchoStar became aware of Sasaki, Yanagihara, Sporer, Peters and Lenihan during the co-pending litigation. None of these references was submitted by TiVo or cited by the Examiner during the prosecution of the '389 Patent. While the present Request is based primarily on the three U.S. patents discussed above, EchoStar is also submitting herewith claims charts illustrating how Sasaki, Yanagihara, Sporer, Peters and Lenihan anticipate or render obvious the



claims upon which reexamination is considered. The claim charts with respect to Sasaki, Yanagihara, Sporer, Peters and Lenihan are attached as Exhibit 11. All of this art also impacts the validity of the remaining claims of the '389 Patent, which should be reviewed as well in reexamination.

## SUMMARY OF THE '389 PATENT

The '389 Patent is directed to a system that captures, stores and displays television broadcast signals. Figure 1 (reproduced below) illustrates the system.



*FIG. 1*

Input Module 101 accepts an input television stream and outputs an MPEG formatted stream. If the television stream is an analog signal, Input Section 101 “converts” the signal into an MPEG formatted stream using separate audio and video encoders. (Col. 2, lines 10-14; Col. 3, lines 49-52). The specification discloses that if the incoming signal already contains an MPEG formatted stream, that MPEG formatted stream is “extracted,” rather than converted. (Col. 2, lines 10-14; Col. 3, lines 46-49). The MPEG formatted stream is then sent to Media Switch 102.

Media Switch 102 parses and separates the interleaved audio and video components of the stream into separate PES streams and stores them in corresponding separate audio and video

buffers. (Col. 4, line 55 to Col. 5, line 19; Figure 4 (e.g., “video buffer” 410 and “audio buffer” 411)). Although the claims merely require that the audio and video components are parsed and separated, the specification further discloses that the Media Switch 102 also may place “events” corresponding to the parsed audio and video components in an “event buffer.” (Col. 5, lines 3-19). From the “events” in the event buffer, the program logic creates and stores separate “logical segments” that correspond to the PES stored in the separate audio and video buffers. (Col. 5, lines 33-38). “Each logical segment points 604 directly to the circular buffer, e.g., the video buffer 613, filled by the Media Switch 601.” (Col. 5, lines 55-57). Thus, the data in the separate audio and video buffers need not be moved because the logical segments point to the actual data in the audio buffer and video buffer. (Col. 5, lines 50-65). The pointer system affords easy access to the separate components of the MPEG information giving “the effect” of storing the data as if it were stored “into a single linear buffer of stream data on the storage medium.” (Col. 5, line 65 to Col. 6, line 15).

Output Section 103, which has an MPEG decoder, receives the audio and video components from storage and produces an analog TV signal. (Col. 4, lines 3-7). Note that Media Switch 102 is said to handle the incoming data asynchronously and autonomously with little support or interaction needed from CPU 106, thereby reducing the load on the CPU. (Col. 2, lines 22-25; Col. 6, lines 16-25).

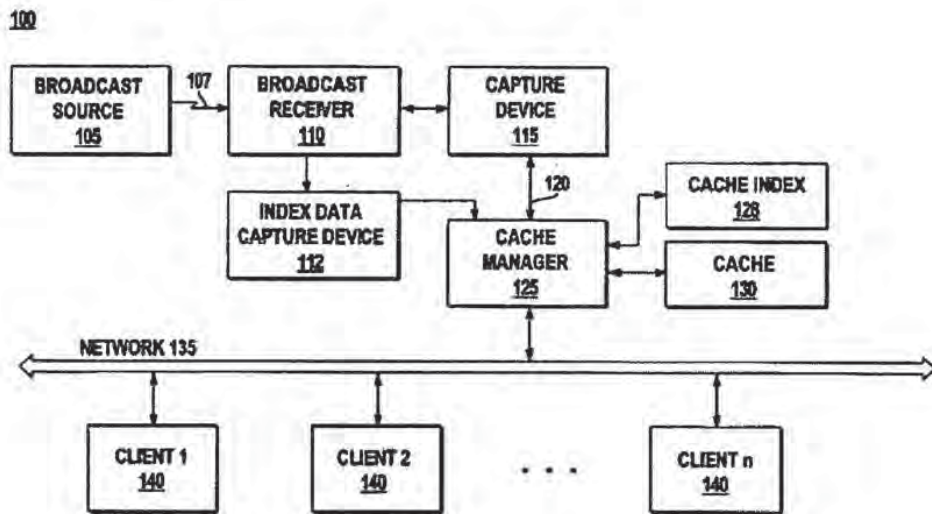
The '389 Patent issued with a total of 61 claims and four independent claims, i.e., claims 1, 31, 32 and 61. Claim 1 is directed to a process that comprises providing an Input Section, a Media Switch and an Output Section. Claim 32 is a corresponding apparatus claim to claim 1.

PRIOR ART

1. U.S. Patent No. 5,614,940 ("Cobbley")

Cobbley (Exhibit 2) issued on March 25, 1997 and, thus, constitutes prior art to the '389 Patent under 35 U.S.C. § 102(a) and 102(b). It was neither submitted by TiVo nor cited by the Examiner during prosecution of the '389 Patent.

Cobbley is directed to a broadcast information transmitting, receiving and distribution system. Figure 1 (reproduced below) illustrates one embodiment.



**FIGURE 1**

Broadcast source 105 transmits broadcast information to broadcast receiver 110 over medium 107. Cobbley explains that the broadcast information can be any type of audio and/or video data, such as a television program broadcast. (See Col. 3, lines 14-20). Capture device 115 receives the audio and video data from broadcast receiver 110. The data can be in digital or

analog form. If the data is in analog form, Cobbley converts the data to digital form. Cobbley discloses that the audio and video data may be compressed using MPEG compression. (See Col. 6, lines 28-54). Capture device 115 and Index Data Capture Device 112 perform further analysis and processing of this digital data and eventually transfer the compressed data to cache manager 125, which stores the data in cache 130.

Cobbley specifically teaches that the Index Data Capture Device and Capture Device may generate indexing information based on an analysis of the audio and video MPEG data. To identify pertinent segments of a broadcast, Cobbley expressly discloses separately scanning the audio data using speech recognition or other audio related analyses and scanning the video data using image recognition or other video related analyses. (See Col. 4, lines 41-56; Col. 6, lines 12-32; Col. 7, lines 1-18). Such scanning generates indexing information for the program segments and their respective multiple story segments. For example, the indexing information may provide a subject matter heading for each of the program segments and keywords for each of the story segments. (See Col. 3, line 60 to Col. 4, line 7). Index data capture device 112 obtains the indexing information. The indexing information is then transferred to cache manager 125.

Capture device 115 and index data capture device 112, respectively, associate a block of audio and video data or indexing information with its time of receipt. This allows the cache manager 125 to correlate the indexing information with the blocks of audio and video data for easy search and retrieval. (See Col. 7, line 47 to Col. 8, line 6). Cache manager 125 can then retrieve segments selected by a user and transfer them to a corresponding client system 140.

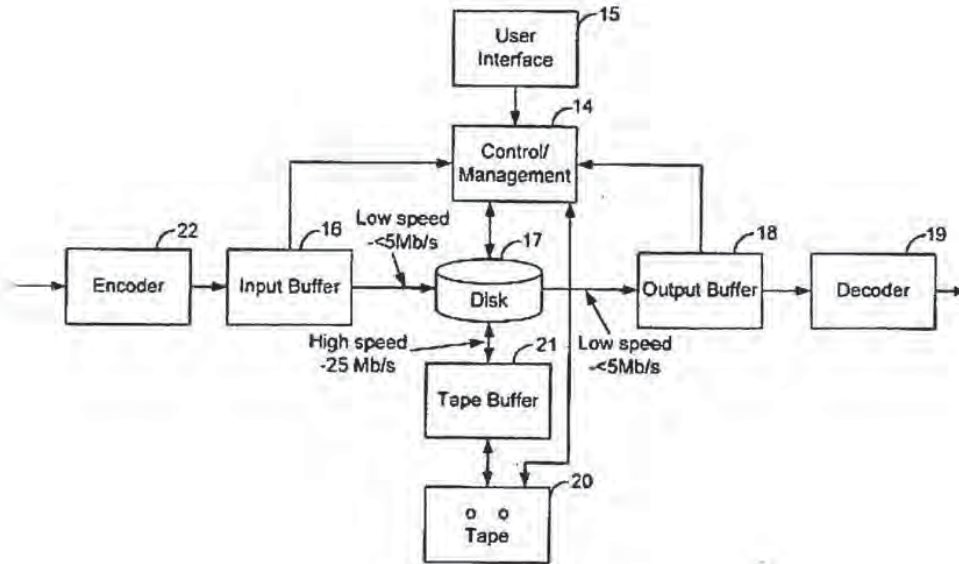
Client system 140 decodes the selected segments and displays them to the user. (See Col. 9, lines 58-63).

Cobbley discloses an embodiment in which the Figure 1 devices, including broadcast receiver 110, index data capture device 112, capture device 115 and cache manager 125 are connected to a client system 140, shown in Figure 5, including the CPU and a display, such as a television. Cobbley expressly states that this invention may be incorporated into a set-top box used in the home with a television. (See Col. 10, lines 7-20; Col. 14, lines 14-46).

**2. U.S. Patent No. 6,304,714 (“Krause ’714”)**

The application for Krause ’714 (Exhibit 3) was filed on November 26, 1997 as a continuation of application no. 08/425,896 filed on April 21, 1995. It therefore constitutes prior art to the ’389 Patent under 35 U.S.C. § 102(e). Krause ’714 was neither submitted by TiVo nor cited by the Examiner during prosecution of the ’389 Patent.

Krause ’714 is directed to a digital home video system that provides simultaneous recording and play back of audio and video data. The system can be incorporated in a set-top box 11 connected to a viewer’s television 12 as illustrated in Figure 1. Figure 2 (reproduced below) illustrates the system.



**FIG. 2.**

The system receives a signal from an outside source (such as a televised signal), encodes the signal with encoder 22, and temporarily stores data in input buffer 16. (See Col. 3, lines 24-26 and Col. 6, lines 55-59). The encoding may include compression utilizing MPEG. (See Col. 4, lines 14-24). Input buffer 16 signals to control device 14 when it has reached a certain filled capacity. Control device 14 then directs high access storage device 17 (e.g., a disk drive) to accept data from input buffer 16. (See Col. 5, line 65 to Col. 6, line 2). The data is subsequently transferred from high access storage device 17 to archival storage medium 20 (e.g., a digital video tape).

While the above recording is taking place, the system can play back previously stored audio and video data. Control device 14 directs high access storage device 17 to transfer the audio and video data to output buffer 18. (See Col. 6, lines 16-23). Output buffer 18 sends the data to a television after decoding by decoder 19. It then updates the control device 14 on its capacity to receive more data. Because the transfer of data from archival medium 20 to high

access storage device 17 is faster than “real time” (i.e., the normal presentation rate of the program), the user can fast forward or rewind through the program using user interface 15. User interface 15 may be a remote control with commands such as play, stop, fast-forward, etc. (See Col. 5, lines 51-57).

Krause '714 recognizes that there may be data retrieval problems for some of the trick play functions, such as multi-speed fast-forward or reverse. During these trick play functions, decoder 19 must remove data from output buffer 18 at a higher rate. Decoder 19, however, may not be able to process all the available data. (See Col. 10, lines 1-13). Krause '714 explains that the control device 14 can instruct decoder 19 to omit certain frames. While this may alleviate the processing performed by decoder 19, medium or disk drive 17 must still transfer data to output buffer 18 at a higher rate. Krause '714 proposes that control device 14 can instruct disk drive 17 to omit certain sections of the data stream when transferring to output buffer 18, but acknowledges that this may impact the performance of the disk drive and, consequently, the system. (See Col. 10, lines 14-24).

### **3. U.S. Patent No. 5,949,948 (“Krause '948”)**

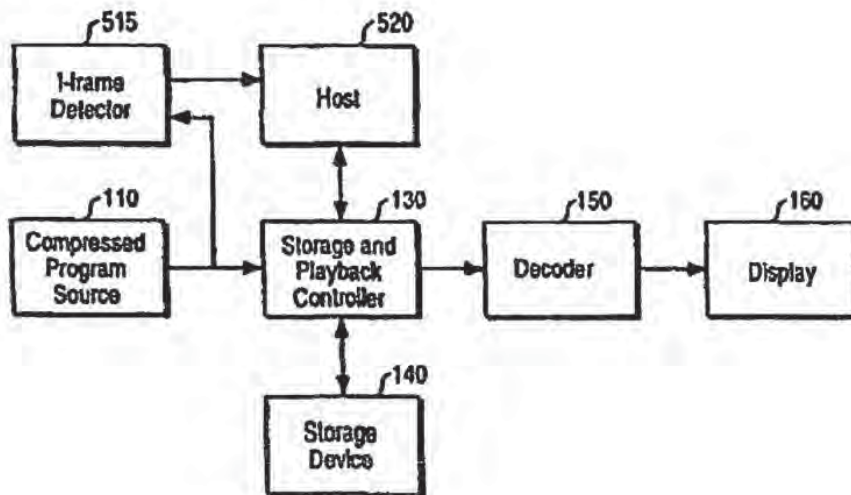
The application for Krause '948 (Exhibit 4) was filed on November 20, 1995, and, thus, constitutes prior art to the '389 Patent under 35 U.S.C. § 102(e). Krause '948 was neither submitted by TiVo nor cited by the Examiner during prosecution of the '389 Patent.

The application that matured into Krause '948 was filed approximately seven months after the filing date of the parent application of Krause '714. The three inventors of Krause '948 are a subset of the inventors of Krause '714. Krause '948 adds to Krause '714 and is directed to improved compressed video data retrieval methods “for supporting multi-speed play back modes



in both forward and reverse directions in an optimal manner.” (Abstract; see also Col. 4, lines 55-59). One embodiment is illustrated in Figure 5 (reproduced below).

FIG. 5



Compressed program source 130 is a source of MPEG-encoded video data and can be an encoder, a cable receiver or a satellite receiver. (Col. 5, lines 1-6 and Col. 6, lines 31-39). As the encoded data is transferred to controller 130, I-frame detector 515 monitors for I-frames. (See Col. 12, lines 1-3). Under the MPEG compression standard, a complete picture can be generated from an I-frame alone. In contrast, P-frames and B-frames are dependent on other frames to complete a picture. Each time I-frame detector 515 detects an I-frame, it interrupts host 520. (See Col. 12, lines 3-5). Host 520, which can be a computer, reads a sequence number corresponding to the detected I-frame and matches it with a storage block currently being addressed on storage device 140. (See Col. 12, lines 5-8). The system of the Krause '948 Patent

relies upon on a hard disk storage device 140 without the need for archival tape storage. (Col. 6, lines 43-48). The resulting table can then be used to efficiently retrieve compressed video data from storage device 140 to decoder 150 for trick play functions, such as fast forward or reverse. The system can retrieve directly the appropriate I-frame for the selected speed of the trick play, thereby reducing the amount of data that needs to be transferred from storage device 140. (See Col. 11, lines 35-55).

## OVERVIEW OF CLAIM CONSTRUCTION ISSUES

In the co-pending litigation relating to the '389 Patent, TiVo and EchoStar submitted respective claim constructions to the Court which recently issued a claim construction ruling (attached as Exhibit 12). TiVo's infringement assertions in the co-pending litigation affect several terms and phrases in the claims of the '389 Patent. For example, claim 1 recites: "providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components." TiVo contends that parsing and separating an MPEG stream does not require actual separation of the stream into distinct audio and video streams, but also encompasses "analyzing" an MPEG stream to look for events (such as audio and video data) in order to generate an event queue or frame index. TiVo accordingly asserts that the term "parses" means merely to analyze in any way, while "separated" means to analyze interleaved audio and video data sufficient to distinguish in any way a video packet from an audio data. (Exhibit 13 at 11-13). EchoStar considers these proposed constructions and other constructions discussed below to be unreasonable. Nevertheless, if claims 1, 6, 20, 21, 23, 32, 37, 51 and 52 are given the scope in reexamination that TiVo asserts in the co-pending litigation, EchoStar respectfully submits that these claims are either anticipated by or obvious in view of the references discussed above.

## DETAILED EXPLANATION OF PERTINENCY OF PRIOR ART TO THE CLAIMS

### 1. Claims 1 and 32

Claim 1 of the '389 Patent is reproduced below:

1. A process for the simultaneous storage and play back of multimedia data, comprising the steps of:

- accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC;
- tuning said TV signals to a specific program;
- providing at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation;
- providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components;
- storing said video and audio components on a storage device;
- providing at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device;
- wherein said Output Section assembles said video and audio components into an MPEG stream;
- wherein said Output Section sends said MPEG stream to a decoder;
- wherein said decoder converts said MPEG stream into TV output signals;
- wherein said decoder delivers said TV output signals to a TV receiver; and
- accepting control commands from a user, wherein said control commands are sent through the system and affect the flow of said MPEG stream.

Independent claim 32 recites apparatus elements that directly correspond to the steps of claim 1.

a. **Claims 1 and 32 are anticipated by Cobbley**

Under the construction that TiVo advances, Cobbley fully discloses each and every element of claims 1 and 32 of the '389 Patent, as discussed below and summarized in the claim chart attached as Exhibit 10. It should be noted that the following analysis only sets forth the steps of claim 1 for ease of review. The analysis, however, applies to each corresponding element of claim 32.

The first step of claim 1 is “accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC.” TiVo construes these claim terms to be met by any single broadcast signal, for example, a DBS or cable signal that, in turn, is based upon numerous sub-standards, including closed caption and other audio or video related standards. (See Exhibit 12 at 8 (“DVB format is based on many specifications and has many related standards.”). This interpretation is unreasonable since it ignores that the claims expressly identify a multitude of *transmission standards*, not merely content-based standards. In any event, Cobbley discloses a broadcast receiver 110 that receives broadcast information from broadcast source 105 over transmission medium 107. Cobbley further discloses that the broadcast information may be transmitted by a wide variety of broadcast sources, such as “a satellite dish, a radio or television transmitter, etc.” (Col. 3, lines 14-20 and 29-42).

The next step is “tuning said TV signals to a specific program.” In the co-pending litigation, TiVo construes this step as “adjusting the system to receive signals at a particular frequency or a particular program.” (See Exhibit 12 at page 13). The Court has construed this

term to mean “tuning said TV signals to a specified frequency range.” (Court’s Claim Construction Order, Exhibit 12 at 14). If TiVo’s (or the Court’s) interpretation is applied in this reexamination, Cobbley fully discloses the step. It discloses an embodiment with multiple broadcast receivers 110. (See Col. 15, lines 34-40). Each of the receivers is tuned to a frequency of a particular broadcast source 105 and its corresponding program. Moreover, as TiVo’s own prior art expert admitted, the disclosure of satellite and other broadcast transmission means (Col. 3, lines 14-20 and 29-42), inherently teaches “tuning said TV signals to a specified frequency range.” (Exhibit 14 at 117:11-118:15).

Claim 1 further recites “providing at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation.” Although unreasonable in view of the patent’s express distinction between “convert” and “extract,”<sup>1</sup> TiVo asserts that this limitation covers situations in which the incoming TV signal is already formatted in MPEG format and is simply demodulated upon receipt. TiVo construes “Input Section” as “hardware and/or code that changes or adapts the form or function of the TV program data to an MPEG format suitable for internal transfer and manipulation.” (Exhibit 12 at page 14). Under TiVo’s interpretation, this step is met by an “Input Section” that extracts MPEG formatted data from a carrier signal through demodulation.

Assuming that this step is given the interpretation in reexamination that TiVo now asserts in the co-pending litigation, Cobbley fully discloses this step. Broadcast Receiver 110 and

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<sup>1</sup> The '389 Patent carefully distinguishes between *converting* non-MPEG data into MPEG data, on the one hand, and *extracting* MPEG from a carrier signal, on the other. (Col. 2, lines 10-14; Col. 3, lines 46-52). As noted in TiVo’s Motion for Partial Summary Judgment, TiVo ignores that distinction in arguing that the claim language

Capture Device 115 receive broadcasts from satellites in analog form and convert the data to digital form. (See Col. 6, lines 32-35). Cobbley further discloses that the data can be in MPEG format. (See Col. 6, lines 36-54).

The next step of claim 1 is “providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components.” TiVo, once again, offers an interpretation that is beyond the broadest reasonable interpretation consistent with the specification.

With respect to the term “Media Switch,” TiVo has defined the term as “hardware and/or code that connects with [a] CPU and memory.” (See Exhibit 12 at page 16). The Court has construed “Media Switch” to mean “hardware and/or code that mediates between a microprocessor CPU, hard-disk or storage device, and memory.” (Court’s Claim Construction Order, Exhibit 12, at 18).

With respect to the “wherein” limitation of this step, TiVo construes the term “parses” to mean “analyzes.” TiVo construes the recitation “wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components” as “analyzes an MPEG stream, the MPEG stream having distinguished video and audio components.” (See Exhibit 12 at pages 16-18). TiVo would have the “parses” and “separated” limitations encompass a system that merely *analyzes* an MPEG stream to identify events and then merely distinguishes audio or video components from other data to perform some other function, for example, generating an index. (See Exhibit 13, page 12). TiVo asserts that these claim limitations do not require actual separation of the data into separate audio and video streams or

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“converts said specific program to an Moving Pictures Group (MPEG) formatted stream” covers demodulating and extracting from an analog carrier signal data that is already in MPEG format. (Exhibit 13 at page 11).

buffers. For support, TiVo notes the '389 Patent describes a parser that analyzes an MPEG stream to look for events such as the start of video or audio data in order to generate an event queue or frame index. (See Col. 5, lines 3-6 and 20-65 of the '389 Patent). It is submitted that when read carefully, it is clear that there is no embodiment shown in the '389 Patent that *merely* logically associates audio and video data stored together in a transport or system stream, without actual physical separation of the original data into separate audio and video buffers. (See Figures 4-6; Col. 4, line 55 to Col. 6, line 58).

It is submitted that TiVo's interpretation of "parses" and "separated" is not reasonable in view of the disclosure of the '389 Patent. However, if TiVo's interpretation is applied in this reexamination, Cobbley fully discloses every element of the recited step.

With respect to the term "Media Switch," the combination of capture device 115, index data capture device 112 and cache manager 125 forms a "Media Switch." Cache manager 125 is connected to and interacts with a memory, for example, cache index 128. (Col. 7, line 38-39). As illustrated in Figure 1 of Cobbley, cache manager 125 is also connected to cache 130, which can be a conventional hard disk. (See Col. 7, lines 19-27). Cache manager 125 is also connected to and communicates with a CPU. Figure 1 illustrates that cache manager 125 is connected to and interacts with a client 140 through network 135. As disclosed in Col. 14, lines 14-46 and illustrated in Figure 5, client system 140 includes at least one processor (e.g., 501). (Col. 14, lines 22-29). Thus, Cobbley discloses that cache manager 125 is connected to and communicates with a processor, i.e., the processor of client 140. It is noted that TiVo's expert agreed that in one embodiment of Cobbley cache manager 125 is connected to the processor of client terminal 140. (See Exhibit 14, 424:2-428:15).



With respect to the “wherein” limitation, Cobbley discloses that the receiving unit can convert incoming data to MPEG format or extract such data if it is already in such a digital format. (Col. 6, lines 28-54; Col. 3, lines 14-25 and 30-33). Cobbley further teaches that this system individually analyzes the audio and video components of the audio and video data. Index data capture device 115 of the receiving unit can scan “the received audio data utilizing a speech recognition process” or “the received video data utilizing an image recognition process.” (Col. 4, lines 41-45; see also Col. 6, lines 16-20). Thus, Cobbley discloses analyzing separately the audio and video components of an MPEG stream to generate indexing information and saving the index information in memory corresponding to those separate components. This meets TiVo’s interpretation of “parsing” and “separating.” Of course, logically analyzing separate audio and video data in an MPEG stream to generate a queue or index was well-known at the time of the filing of the application. (See, e.g., U.S. Patent No. 5,577,190 at Col. 15, line 50 to Col. 16, line 35, Exhibit 8 hereto). Indeed, at the time the application leading to the ’389 Patent was filed, there was already a rich set of published research disclosing parsing and indexing of audio or video components. (See example publications attached as Exhibit 16).

Claim 1 further recites “storing said video and audio components on a storage device.” TiVo construes this term to include systems in which audio and video data remain interleaved and are not stored separately, which is unreasonable given that the claims refer to the “said video and audio components” that were “separated” in the prior claim limitation. Cobbley discloses that the distinguished audio and video data and the related index information that corresponds to those distinguished sets of data are stored in cache 130. (See Col. 7, lines 19-27). Cache 130 can be a conventional disk drive as discussed above.

The next two recitations are “providing at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device” and “wherein said Output Section assembles said video and audio components into *an* MPEG stream” (emphasis added). TiVo construes these steps as “hardware and/or code that takes program data from memory and brings it together as an MPEG stream for play back.” (See Exhibit 12 at page 19). It is not necessary, according to TiVo, that separate audio and video streams be retrieved from storage and then assembled back into a single MPEG stream. EchoStar believes TiVo’s interpretation is unreasonable because the separate audio and video components must be “assembled” into “an” MPEG stream.

If TiVo’s interpretation asserted in the co-pending litigation is applied in this reexamination, then Cobbley fully discloses an “Output Section” that extracts video and audio components from a storage device and assembles the components into “an MPEG stream.” Specifically, Cobbley discloses that cache manager 125 can retrieve and output video and audio data from cache 130 in response to a user request for a particular story segment. (Col. 8, lines 6-10; see also Col. 9, lines 58-61). As discussed above, Cobbley expressly discloses using MPEG formatted streams. Thus, by retrieving the selected segments and transferring the segments to a client terminal, cache manager 125 inherently takes data from a memory and produces an MPEG stream for playback. Under TiVo’s broad interpretation, there is no need for Cobbley to disclose that it interleaves the separated audio and video streams back into a single MPEG stream for playback.

Claim 1 further recites “wherein said Output Section sends said MPEG stream to a decoder,” “wherein said decoder converts said MPEG stream into TV output signals” and

“wherein said decoder delivers said TV output signals to a TV receiver.” Cobbley discloses that the client system 140, once it receives the selected segments, “decompresses” the selected segments and displays them to the individual user. (See Col. 9, lines 61-63). As discussed above, client system 140 is expressly taught as including a display, such as a television. (Col. 3, lines 54-59; Col. 10, lines 7-20).

The last recitation of claim 1 is “accepting control commands from a user, wherein said control commands are sent through the system and affect the flow of said MPEG stream.” Figure 2 of Cobbley illustrates buttons, such as pause 230d and scanning rewind 230e, on a user-interface of client terminal 140. (See also Col. 11, lines 35-48).

EchoStar notes that although the preamble – stating the purpose of the invention is “for the simultaneous storage and play back of multimedia data” – is not a limitation, Cobbley fully discloses simultaneous storage and play back of audio and video data: “By storing multiple broadcasts, cache manager 125 is able to update cache 130 with the newest version of a program segment while end users are viewing older versions of the segment.” (Col. 8, lines 45-48). TiVo’s expert in the co-pending litigation has not disputed that the preamble terms are met by the Cobbley prior art reference.

**b. Claims 1 and 32 are obvious in view of Krause '714 and Krause '948**

Claims 1 and 32 of the '389 Patent are obvious in view of Krause '714 and Krause '948. The analysis is set forth below and summarized in the claim chart attached as Exhibit 10. It should be noted, once again, that the following analysis only refers to the steps of claim 1 for ease of review.

If the preamble is considered as a limitation, then Krause '714 fully discloses a process that provides simultaneous recording and play back of audio and video data. (See, e.g., Abstract).

The first recited step of claim 1 is accepting television broadcast signals based on a multitude of different standards. Krause '714 discloses that the system receives a "television signal, or a signal from any other outside source . . . ." (Col. 3, lines 24-26; see also Col. 4, lines 22-23 and Col. 5, lines 62-65).

The second step is tuning "said" television signals to a specific program. The Krause '714 Patent inherently discloses adjusting the system to receive signals at a particular frequency. To receive a television signal from an outside source requires that the system tune to a particular frequency.

The next step of claim 1 is fully disclosed by the Krause '714 Patent. Claim 1 recites "providing at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation." As discussed above, TiVo construes "Input Section" as hardware and/or code that changes or adapts the form or function of the TV program data to an MPEG format suitable for internal transfer and manipulation. Krause '714 explains that the received audio and video data is converted to digital data and can be compressed using MPEG. (See Col. 4, lines 14-24 and 34-39). EchoStar notes that the Krause '948 Patent also discloses that data can be encoded utilizing MPEG. (See Col. 5, lines 1-4).

The next step is "providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components." As

discussed above, Krause '714 discloses that its system can convert incoming data into MPEG streams. (See Col. 4, lines 34-39). The Krause '714 Patent does not disclose a Media Switch that parses the MPEG stream and separates the stream into its audio and video components. That limitation, as TiVo has applied it in the litigation, is met by the Krause '948 Patent.

The Krause '948 Patent discloses that I-frame detector 515 detects I-frames in an MPEG stream for creating an index of the I-frames in storage. This is sufficient under TiVo's litigation interpretation. According to TiVo, this step encompasses analyzing an MPEG stream for events (such as audio or video data) and logically distinguishing the events for an index. The I-frame detector of Krause '948 analyzes an MPEG stream for video components and logically distinguishes the video components to generate an index. Indeed, TiVo's own expert believes that the I-frame detector satisfies the limitation "parses said MPEG stream, said MPEG stream is separated into its video and audio components." (See Exhibit 14, 589:2-594:21).

I-frame detector 515 of the Krause '948 Patent also satisfies TiVo's construction that a "Media Switch" connects with a CPU and memory. I-frame detector 515 is positioned between the compressed program source 110 and two processors, i.e., host 520 and the storage play back controller 130. I-frame detector 515 is connected through host 520 and controller 130 to storage 140 of the Krause '948 Patent, which permits it to correlate the detected I-frame with the storage block being addressed on storage device 140. (See Col. 12, lines 1-8 of Krause '948).

It would have been obvious to modify Krause '714 to include I-frame detector 515 of Krause '948 in the manner described above. The Krause '948 Patent was filed seven months after the Krause '714 Patent by a subset of the inventors of the '714 Patent. The Krause '948 Patent addressed the very problem raised by the same inventors in Krause '714, i.e., an efficient

retrieval of data for multi-speed trick play functions. One of ordinary skill in the art would have been motivated to include I-frame detector 515 in Krause '714, because it creates an index that allows data to be retrieved efficiently from a disk drive without compromising its performance.

The Krause '714 Patent fully discloses all the remaining steps.<sup>2</sup> Krause '714 discloses that audio and video data in input buffer 16 is stored on high access storage medium 17. (See Col. 6, lines 17-34). Medium 17 can be a disk drive. (See Col. 5, lines 16-18). Krause '714 thus discloses “storing said video and audio components on a storage device” as TiVo has construed those terms.

The Krause '714 Patent discloses an “Output Section” that extracts audio and video data from the storage device and brings it together as an MPEG stream for play back. Output buffer 18 updates control device 14 on its capacity and receives data from high access storage medium 17 based on the update. (See Col. 6, lines 2-10). Output buffer 18 of Krause '714 inherently produces an MPEG stream before sending the data to decoder 19. This meets the limitations as TiVo has construed them.

The next step is that the Output Section sends the MPEG stream to a decoder. Krause '714 discloses that output buffer 18 sends the data to decoder 19 as discussed above. (Col. 6, lines 2-10). Decoder 19 then sends the signals to receiver 11 which, in turn, is connected to television 12. (See Col. 5, lines 46-49 and Col. 6, lines 2-10 and Figure 1). This disclosure meets TiVo's interpretation of the next two recitations, i.e., “wherein said decoder converts said MPEG stream into TV output signals and wherein said decoder delivers said TV output signals to a TV receiver.”

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<sup>2</sup> Krause '948 fully discloses many of the remaining steps as well. For ease of review, only citations to Krause '714 are provided herein. Citations to Krause '948 may be found in the accompanying claim chart. (See Exhibit 10).

Finally, claim 1 recites the step of “accepting control commands from a user wherein said control commands are sent through the system and affect the flow of said MPEG stream.” As discussed above, Krause '714 discloses user interface 15. The interface allows the user to issue commands such as play, stop, fast-forward, etc. (Col. 5, lines 52-57). Under TiVo’s interpretation, this meets the claim language.

Accordingly, claims 1 and 32 are obvious in view of the Krause '714 and Krause '948 Patents under 35 U.S.C. § 103(a).

2. **Dependent Claims 6, 20, 21, 23, 37, 51 and 52 are anticipated by or obvious in view of Cobbley, Krause '714 and Krause '948**

Claims 6 and 37 of the '389 Patent are identical in substance. Claim 6 is reproduced below:

**6. The process of claim 1, wherein said Media Switch calculates and logically associates a time stamp to said audio and video components.**

Claim 6 depends from claim 1 and recites that the Media Switch calculates and logically associates a time stamp to the audio and video components.

Claim 6 is anticipated by Cobbley (as is claim 37). As discussed above, the cache manager 125 correlates the indexing information from index data capture device 112 with the blocks of video and audio data from capture device 115 based on the time stamps provided by each of these devices. (See Col. 7, lines 48-65).

It is further noted that all three patents disclose the use of MPEG compression as discussed above. Under the MPEG standard, an MPEG encoder calculates and logically associates a time stamp to audio and video data. (See Exhibit 15 (for example, International Standard ISO/IEC 11172-1:1993 Part 1, §§ A.2.2, A.3.1.1, A.3.4 and A.5.5)).

Claims 20 and 51 of the '389 Patent are identical in substance. Claim 20 is reproduced below:

**20. The process of claim 1, wherein said Media Switch operates asynchronously and autonomously with a CPU.**

Claim 20 depends from claim 1 and recites that the Media Switch operates asynchronously and autonomously with a CPU.

Claim 20 is anticipated by Cobbley (as is claim 51). The combination of capture device 115, index data capture device 112 and cache manager 125 forms a "Media Switch," as TiVo has construed that term. Figure 1 illustrates that these devices are connected to a client 140 through network 135. As disclosed in Col. 14, lines 14-46 and illustrated in Figure 5, client system 140 includes at least one processor (e.g., 501). (Col. 14, lines 22-29). The CPU is clearly depicted as operating separately from the "Media Switch" elements in Figure 1. Indeed, the same issues are identified in the Cobbley reference and the '389 Patent (see '389 Patent, Col. 2, lines 22-25; Col. 7, lines 20-23), concerning the need for separately operating processes to manage the asynchronous incoming data as soon as it arrives without dependence upon the clocking or operation of the CPU: "In one implementation of the present invention, capture device 115 operates in a pipelined manner to continuously process the received broadcast information. That is, as soon as a block of data is received it is converted to digital form (if necessary), compressed, and transferred to cache manager 125." (Cobbley, Col. 7, lines 1-18). Cobbley also discloses the use of an asynchronous bus, for example a 10 Mbps Ethernet network for communications with the CPU and other devices. (Col. 6, lines 51-64; Col. 9, lines 45-50).



Claims 20 and 51 are also obvious in view of the Krause '714 and Krause '948 Patents. As illustrated in Figure 5 of the Krause '948 Patent, I-frame detector 515 is an asynchronous and autonomous hardware unit.

Claims 21 and 52 of the '389 Patent are identical in substance. Claim 21 is reproduced below:

**21. The process of claim 1, wherein said storage device is connected to said Media Switch.**

Claim 21 depends from claim 1 and recites that the storage device is connected to the Media Switch. Claim 21 is anticipated by Cobbley (as is claim 52). Figure 5 illustrates that device 513 is connected through bus 500 to data storage device 500. Claim 21 is also obvious in view of Krause '714 and Krause '948. As discussed above, in the Krause '948 Patent, I-frame detector 515 is connected to storage device 140 through host 520 and controller 130.

Claim 23 of the '389 Patent is reproduced below:

**23. The process of claim 1, wherein said Media Switch is implemented in hardware.**

Claim 23 depends from claim 1. It recites that the Media Switch is implemented in hardware. Claim 23 is anticipated by Cobbley. For example, Cobbley illustrates capture device 115 and cache manager 125 as hardware modules in Figure 1. Claim 20 is also obvious in view of Krause '714 and Krause '948. As illustrated in Figure 5 of the Krause '948 Patent, I-frame detector 515 is a separate hardware unit.

### SUBSTANTIAL NEW QUESTIONS OF PATENTABILITY

Cobbley, Krause '714 and Krause '948 were not of record in the '389 Patent. Because these references either anticipate or render obvious claims 1, 6, 20, 21, 23, 32, 37, 51 and 52 of the '389 Patent, substantial new questions of patentability are raised.

As discussed above, EchoStar also believes that claims 1, 6, 20, 21, 23, 32, 37, 51 and 52 are anticipated by or obvious in view of a number of other references, including Sasaki, Yanagihara, Sporer, Peters and Lenihan. While the present Request is based on the Cobbley, Krause '714 and Krause '948 Patents, EchoStar is also submitting herewith claims charts for Sasaki, Yanagihara, Sporer, Peters and Lenihan (see Exhibit 11).

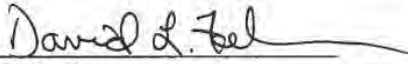
**CONCLUSION**

For the reasons set forth above, EchoStar requests reexamination of claims 1, 6, 20, 21, 23, 32, 37, 51 and 52 of the '389 Patent.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, EchoStar petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 454030000041.

Dated: October 17, 2005

Respectfully submitted,

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# **EXHIBIT 1**



US006233389B1

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

(10) **Patent No.:** **US 6,233,389 B1**  
(45) **Date of Patent:** **May 15, 2001**

(54) **MULTIMEDIA TIME WARPING SYSTEM**

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

(\*) **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.:** 09/126,071

(22) **Filed:** Jul. 30, 1998

(51) **Int. Cl.:** H04N 5/92

(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

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ASTARTE DVDirector™ Beta Testing Program.

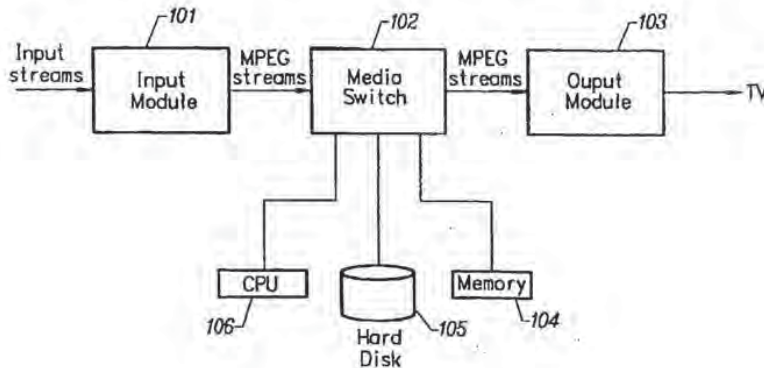
*Primary Examiner*—Thai Tran

(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 Committee (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 internal 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 indicate 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



# US 6,233,389 B1

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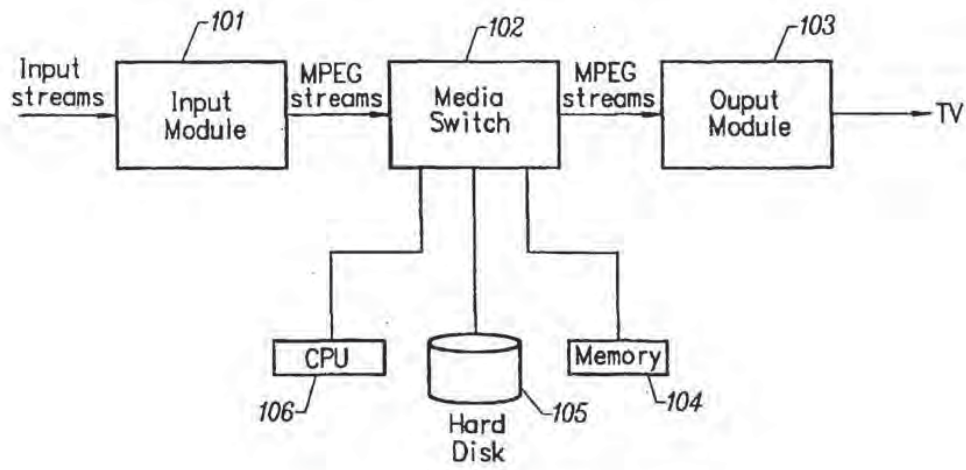


FIG. 1

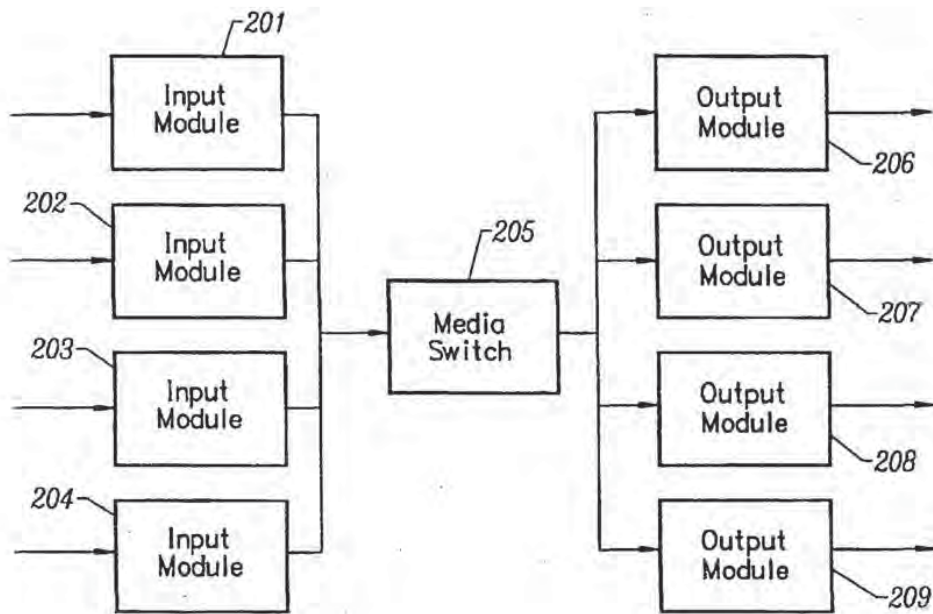


FIG. 2



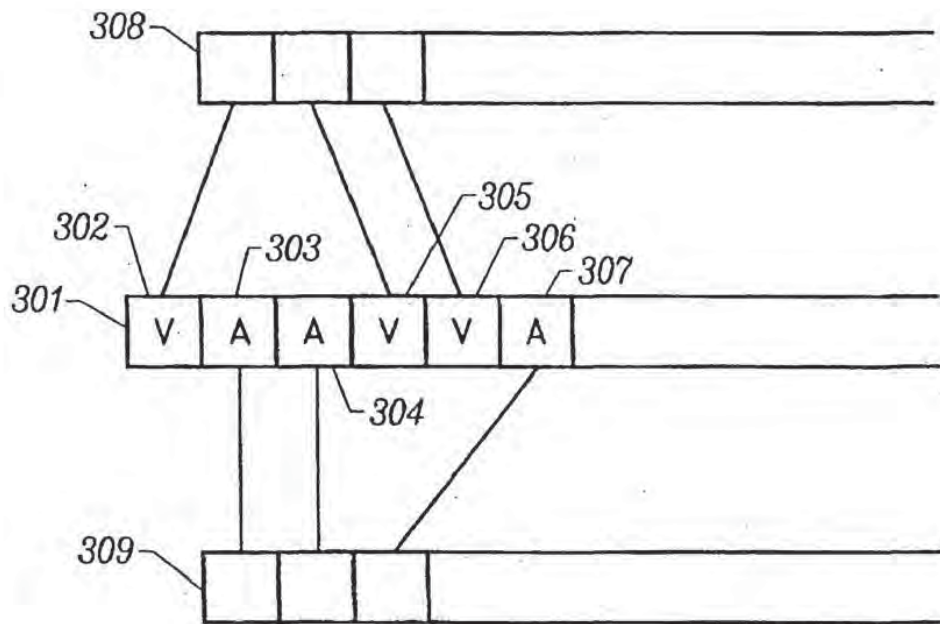


FIG. 3

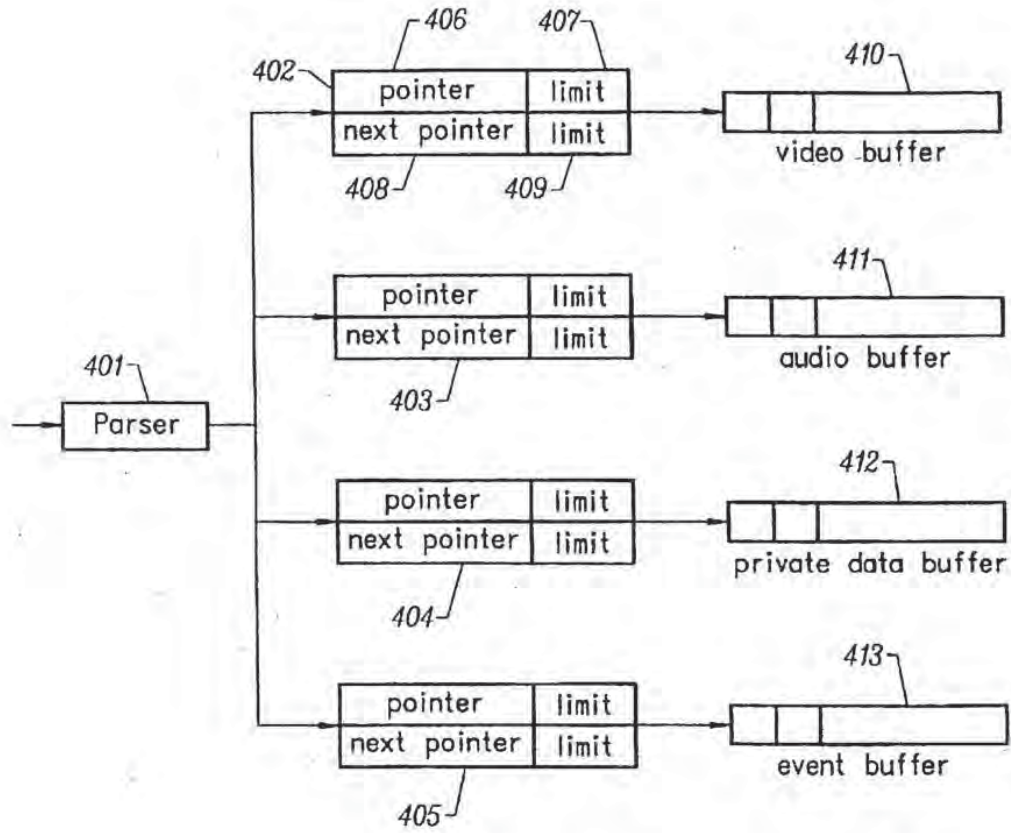


FIG. 4

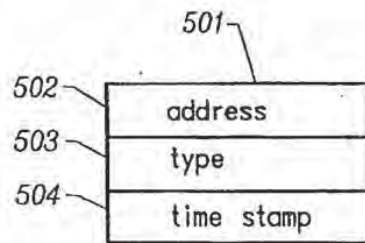


FIG. 5

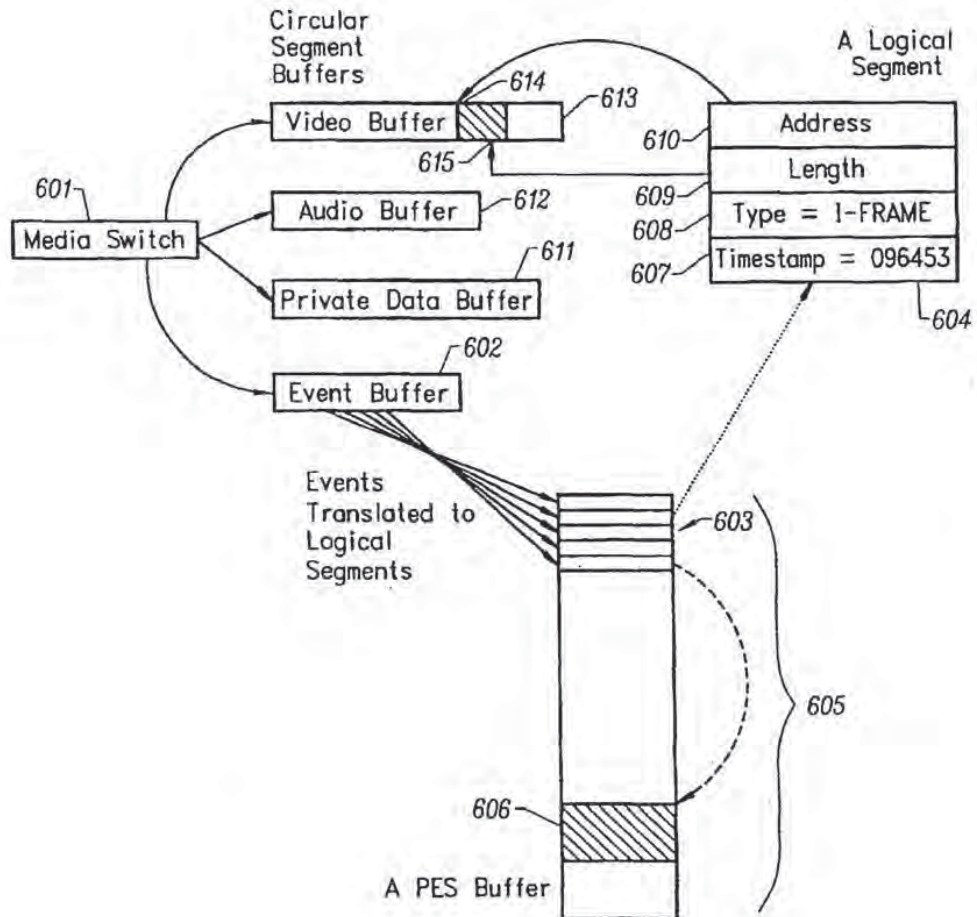


FIG. 6

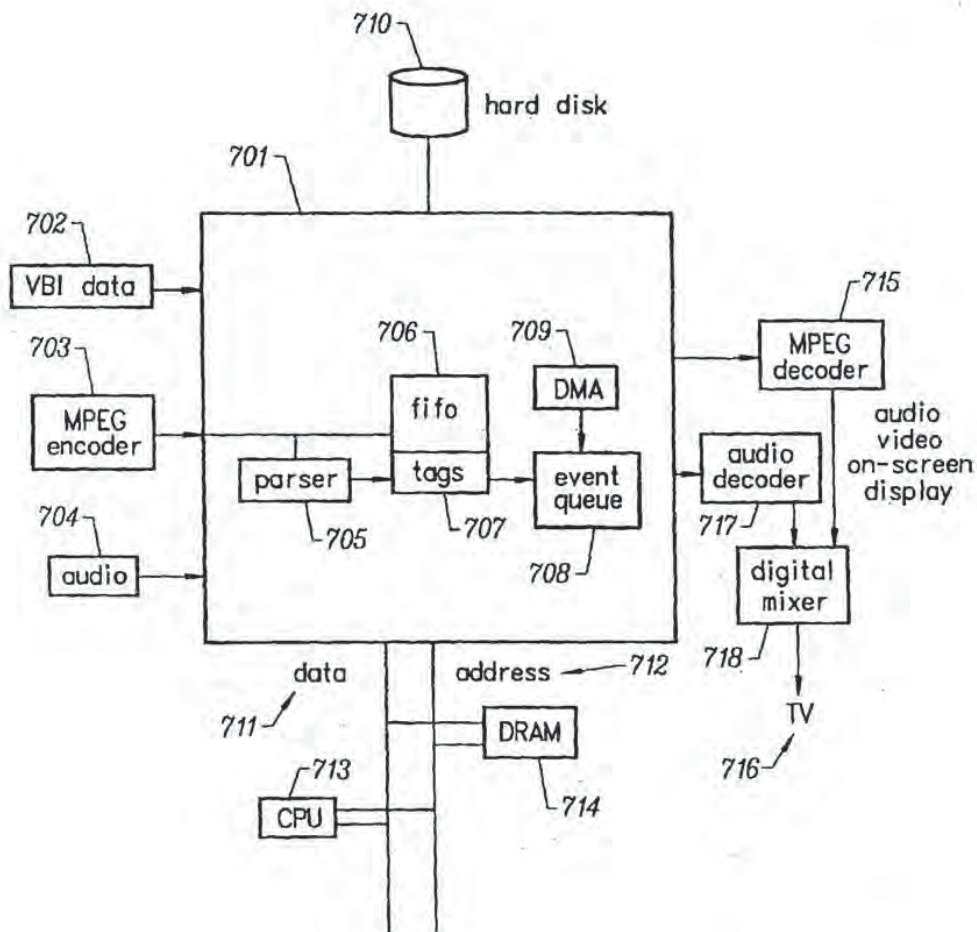


FIG. 7

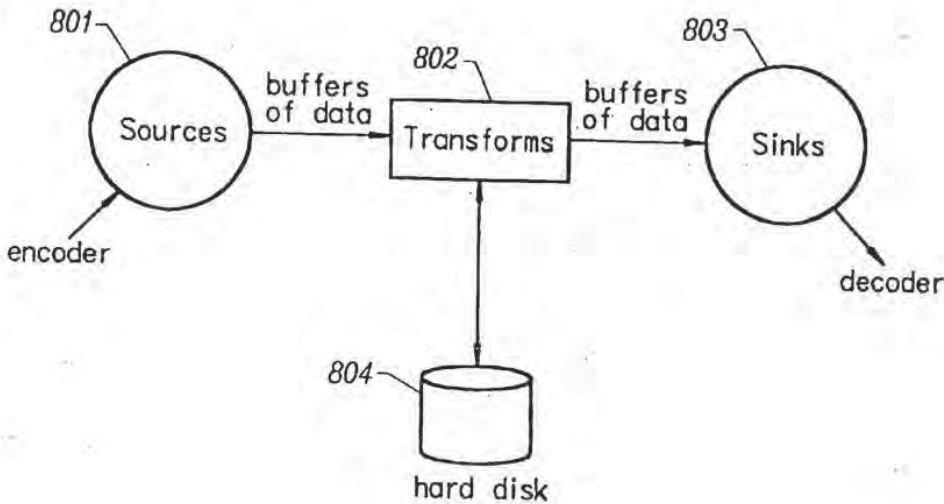


FIG. 8

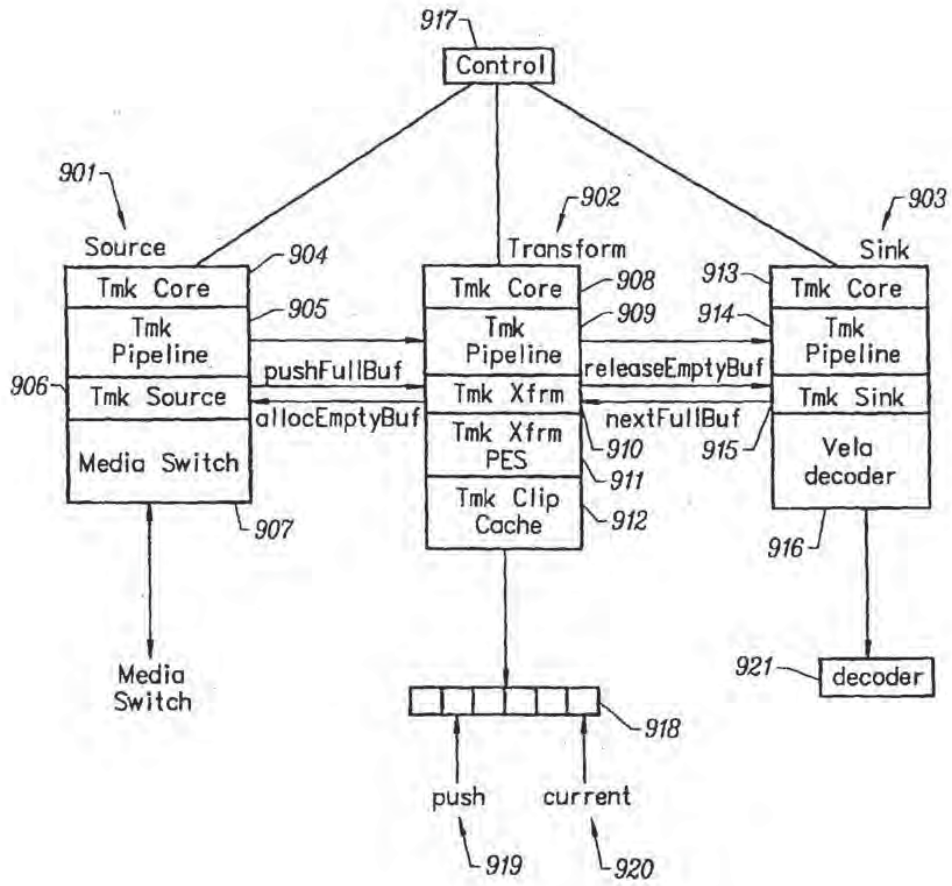


FIG. 9

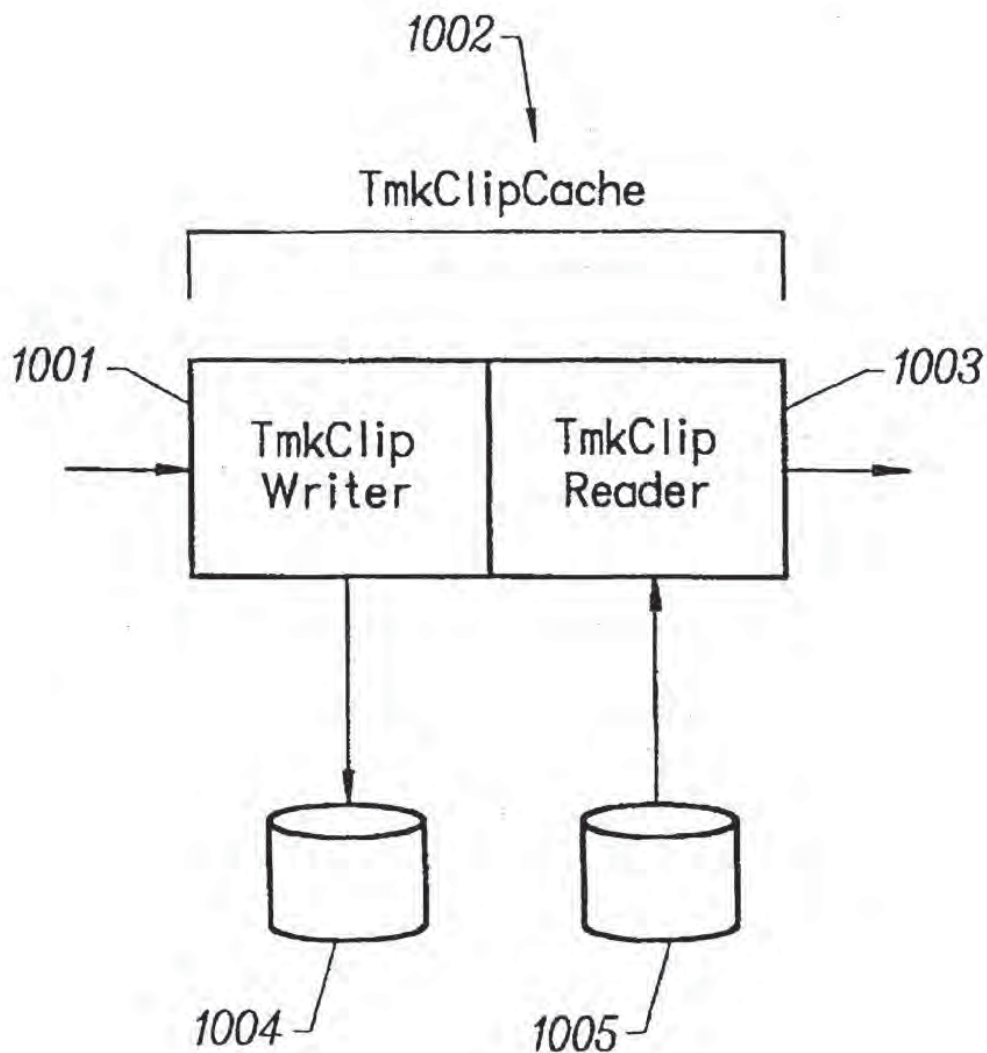


FIG. 10

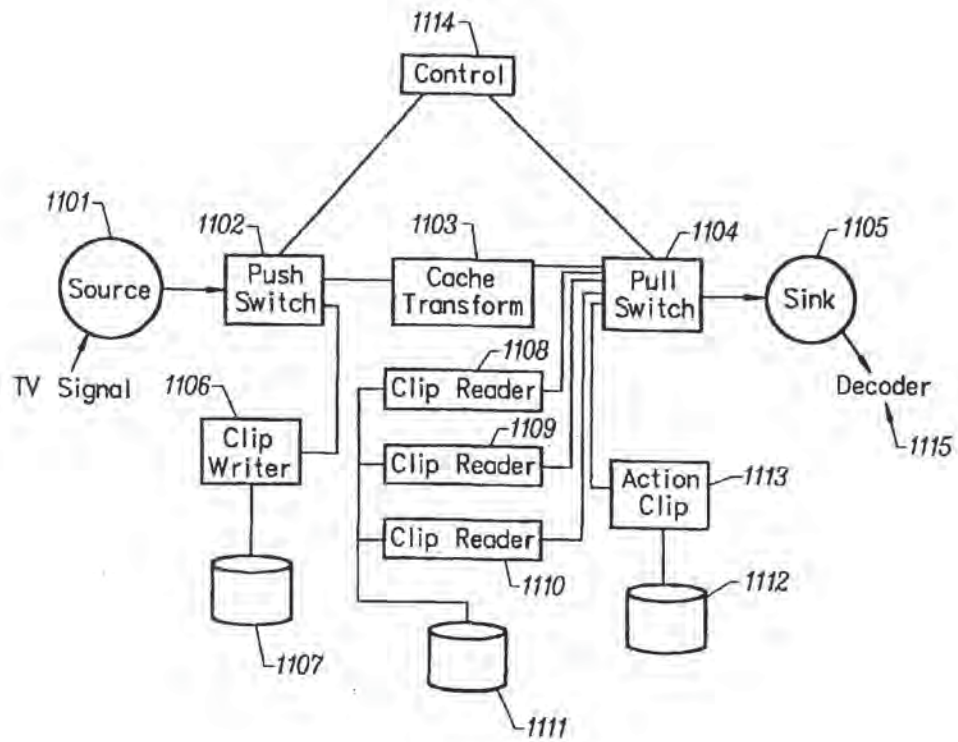


FIG. 11



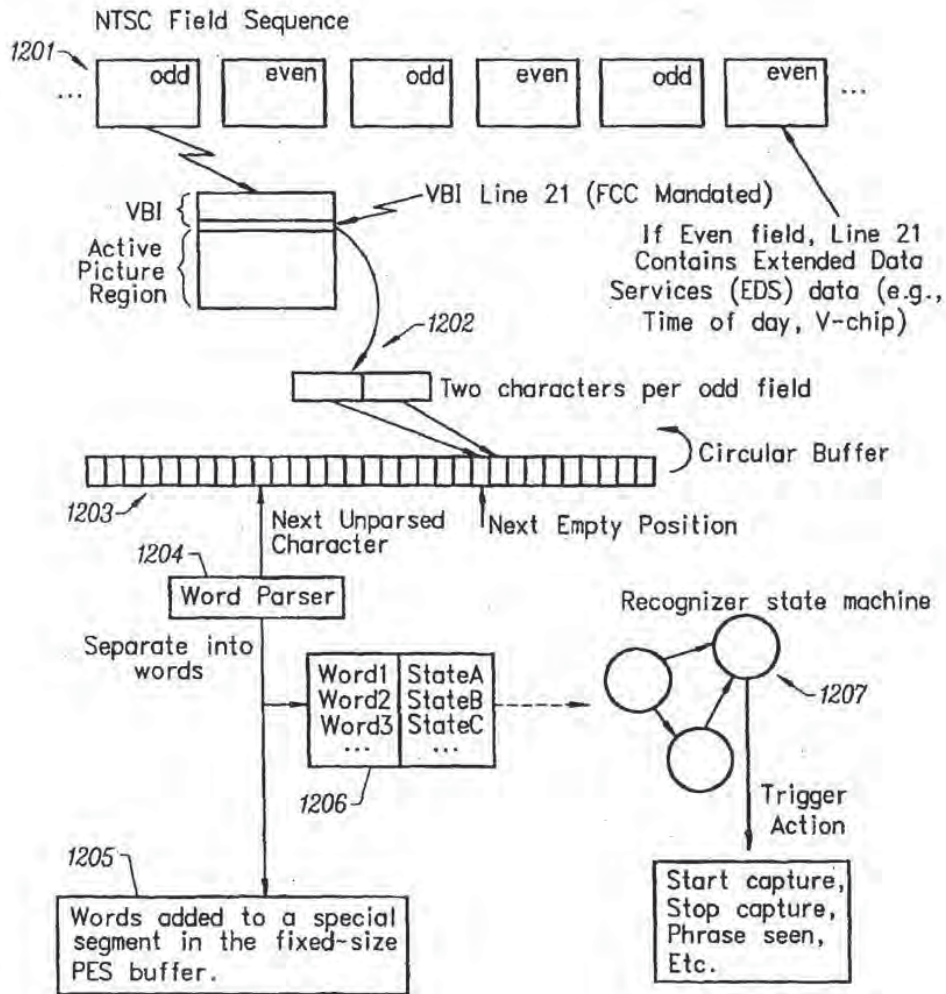


FIG. 12

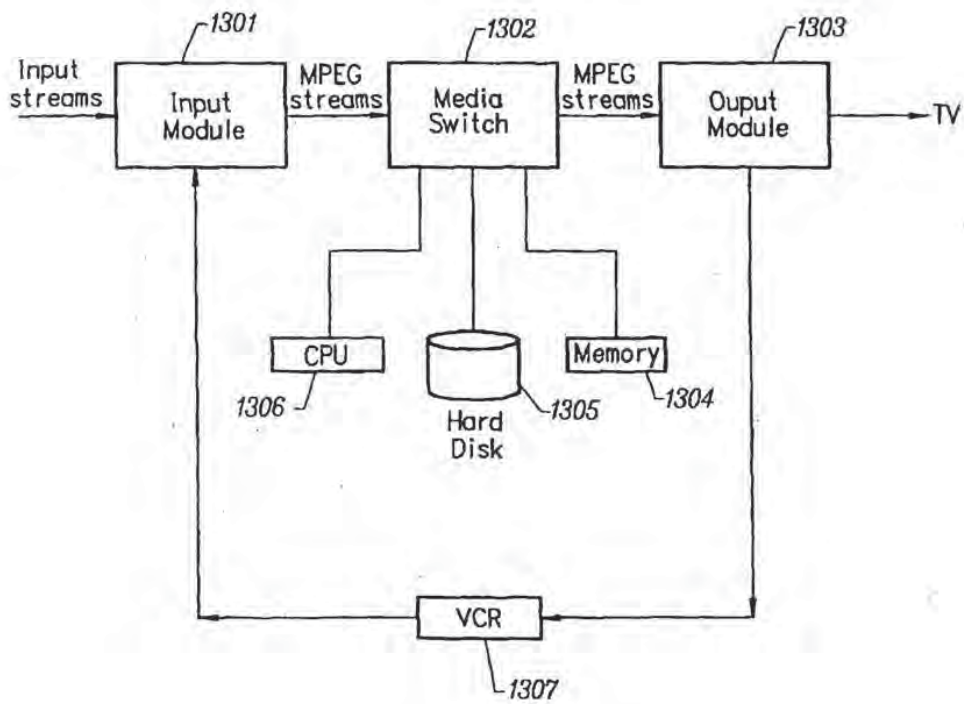


FIG. 13

## MULTIMEDIA TIME WARPING SYSTEM

## BACKGROUND OF THE INVENTION

## 1. Technical Field

The invention relates to the time shifting of television broadcast signals. More particularly, the invention relates to the real time capture, storage, and display of television broadcast signals.

## 2. Description of the Prior Art

The Video Cassette Recorder (VCR) has changed the lives of television (TV) viewers throughout the world. The VCR has offered viewers the flexibility to time-shift TV programs to match their lifestyles.

The viewer stores TV programs onto magnetic tape using the VCR. The VCR gives the viewer the ability to play, rewind, fast forward and pause the stored program material. These functions enable the viewer to pause the program playback whenever he desires, fast forward through unwanted program material or commercials, and to replay favorite scenes. However, a VCR cannot both capture and play back information at the same time.

One approach to solving this problem is to use several VCRs. For example, if two video tape recorders are available, it might be possible to Ping-Pong between the two. In this case, the first recorder is started at the beginning of the program of interest. If the viewer wishes to rewind the broadcast, the second recorder begins recording, while the first recorder is halted, rewound to the appropriate place, and playback initiated. However, at least a third video tape recorder is required if the viewer wishes to fast forward to some point in time after the initial rewind was requested. In this case, the third recorder starts recording the broadcast stream while the second is halted and rewound to the appropriate position. Continuing this exercise, one can quickly see that the equipment becomes unwieldy, unreliable, expensive, and hard to operate, while never supporting all desired functions. In addition, tapes are of finite length, and may potentially end at inconvenient times, drastically lowering the value of the solution.

The use of digital computer systems to solve this problem has been suggested. U.S. Pat. No. 5,371,551 issued to Logan et al., on Dec. 6, 1994, teaches a method for concurrent video recording and playback. It presents a microprocessor controlled broadcast and playback device. Said device compresses and stores video data onto a hard disk. However, this approach is difficult to implement because the processor requirements for keeping up with the high video rates makes the device expensive and problematic. The microprocessor must be extremely fast to keep up with the incoming and outgoing video data.

It would be advantageous to provide a multimedia time warping system that gives the user the ability to simultaneously record and play back TV broadcast programs. It would further be advantageous to provide a multimedia time warping system that utilizes an approach that decouples the microprocessor from the high video data rates, thereby reducing the microprocessor and system requirements which are at a premium.

## SUMMARY OF THE INVENTION

The invention provides a multimedia time warping system. The invention utilizes an easily manipulated, low cost multimedia storage and display system that allows the user to view a television broadcast program with the option of instantly reviewing previous scenes within the program. In

addition, 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, analog forms such as National Television Standards Committee (NTSC) or PAL broadcast, and digital forms such as Digital Satellite System (DSS), Digital Broadcast Services (DBS), or Advanced Television Standards Committee (ATSC). Analog TV streams are converted to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation, while pre-formatted MPEG streams are extracted from the digital TV signal and presented in a similar format to encoded analog streams.

The invention parses the resulting MPEG stream and separates it into its video and audio components. It then stores the components into temporary buffers. Events are recorded that indicate 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. This decoupling allows for slower CPU and bus speeds which translate to lower system costs. The video and audio components are stored on a storage device. When the program is requested for display, the video and audio components are extracted from the storage device and reassembled into an MPEG stream. The MPEG stream 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.

Other aspects and advantages of the invention will become apparent from the following detailed description in combination with the accompanying drawings, illustrating, by way of example, the principles of the invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block schematic diagram of a high level view of a preferred embodiment of the invention according to the invention;

FIG. 2 is a block schematic diagram of a preferred embodiment of the invention using multiple input and output modules according to the invention;

FIG. 3 is a schematic diagram of an Moving Pictures Experts Group (MPEG) data stream and its video and audio components according to the invention;

FIG. 4 is a block schematic diagram of a parser and four direct memory access (DMA) input engines contained in the Media Switch according to the invention;

FIG. 5 is a schematic diagram of the components of a packetized elementary stream (PES) buffer according to the invention;

FIG. 6 is a schematic diagram of the construction of a PES buffer from the parsed components in the Media Switch output circular buffers;

FIG. 7 is a block schematic diagram of the Media Switch and the various components that it communicates with according to the invention;

FIG. 8 is a block schematic diagram of a high level view of the program logic according to the invention;

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FIG. 9 is a block schematic diagram of a class hierarchy of the program logic according to the invention;

FIG. 10 is a block schematic diagram of a preferred embodiment of the clip cache component of the invention according to the invention;

FIG. 11 is a block schematic diagram of a preferred embodiment of the invention that emulates a broadcast studio video mixer according to the invention;

FIG. 12 is a block schematic diagram of a closed caption parser according to the invention; and

FIG. 13 is a block schematic diagram of a high level view of a preferred embodiment of the invention utilizing a VCR as an integral component of the invention according to the invention.

#### DETAILED DESCRIPTION OF THE INVENTION

The invention is embodied in a multimedia time warping system. A system according to the invention provides a multimedia storage and display system that allows the user to view a television broadcast program with the option of instantly reviewing previous scenes within the program. The invention additionally provides the user with the ability to store selected television broadcast programs while simultaneously watching or reviewing another program and to view stored programs with at least the following functions: reverse, fast forward, play, pause, index, fast/slow reverse play, and fast/slow play.

Referring to FIG. 1, a preferred embodiment of the invention has an Input Section 101, Media Switch 102, and an Output Section 103. The Input Section 101 takes television (TV) input streams in a multitude of forms, for example, National Television Standards Committee (NTSC) or PAL broadcast, and digital forms such as Digital Satellite System (DSS), Digital Broadcast Services (DBS), or Advanced Television Standards Committee (ATSC). DBS, DSS and ATSC are based on standards called Moving Pictures Experts Group 2 (MPEG2) and MPEG2 Transport. MPEG2 Transport is a standard for formatting the digital data stream from the TV source transmitter so that a TV receiver can disassemble the input stream to find programs in the multiplexed signal. The Input Section 101 produces MPEG streams. An MPEG2 transport multiplex supports multiple programs in the same broadcast channel, with multiple video and audio feeds and private data. The Input Section 101 tunes the channel to a particular program, extracts a specific MPEG program out of it, and feeds it to the rest of the system. Analog TV signals are encoded into a similar MPEG format using separate video and audio encoders, such that the remainder of the system is unaware of how the signal was obtained. Information may be modulated into the Vertical Blanking Interval (VBI) of the analog TV signal in a number of standard ways; for example, the North American Broadcast Teletext Standard (NABTS) may be used to modulate information onto lines 10 through 20 of an NTSC signal, while the FCC mandates the use of line 21 for Closed Caption (CC) and Extended Data Services (EDS). Such signals are decoded by the input section and passed to the other sections as if they were delivered via an MPEG2 private data channel.

The Media Switch 102 mediates between a microprocessor CPU 106, hard disk or storage device 105, and memory 104. Input streams are converted to an MPEG stream and sent to the Media Switch 102. The Media Switch 102 buffers the MPEG stream into memory. It then performs two operations if the user is watching real time TV: the stream is sent

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to the Output Section 103 and it is written simultaneously to the hard disk or storage device 105.

The Output Section 103 takes MPEG streams as input and produces an analog TV signal according to the NTSC, PAL, or other required TV standards. The Output Section 103 contains an MPEG decoder, On-Screen Display (OSD) generator, analog TV encoder and audio logic. The OSD generator allows the program logic to supply images which will be overlaid on top of the resulting analog TV signal. Additionally, the Output Section can modulate information supplied by the program logic onto the VBI of the output signal in a number of standard formats, including NABTS, CC and EDS.

With respect to FIG. 2, the invention easily expands to accommodate multiple Input Sections (tuners) 201, 202, 203, 204, each can be tuned to different types of input. Multiple Output Modules (decoders) 206, 207, 208, 209 are added as well. Special effects such as picture in a picture can be implemented with multiple decoders. The Media Switch 205 records one program while the user is watching another. This means that a stream can be extracted off the disk while another stream is being stored onto the disk.

Referring to FIG. 3, the incoming MPEG stream 301 has interleaved video 302, 305, 306 and audio 303, 304, 307 segments. These elements must be separated and recombined to create separate video 308 and audio 309 streams or buffers. This is necessary because separate decoders are used to convert MPEG elements back into audio or video analog components. Such separate delivery requires that time sequence information be generated so that the decoders may be properly synchronized for accurate playback of the signal.

The Media Switch enables the program logic to associate proper time sequence information with each segment, possibly embedding it directly into the stream. The time sequence information for each segment is called a time stamp. These time stamps are monotonically increasing and start at zero each time the system boots up. This allows the invention to find any particular spot in any particular video segment. For example, if the system needs to read five seconds into an incoming contiguous video stream that is being cached, the system simply has to start reading forward into the stream and look for the appropriate time stamp.

A binary search can be performed on a stored file to index into a stream. Each stream is stored as a sequence of fixed-size segments enabling fast binary searches because of the uniform time stamping. If the user wants to start in the middle of the program, the system performs a binary search of the stored segments until it finds the appropriate spot, obtaining the desired results with a minimal amount of information. If the signal were instead stored as an MPEG stream, it would be necessary to linearly parse the stream from the beginning to find the desired location.

With respect to FIG. 4, the Media Switch contains four input Direct Memory Access (DMA) engines 402, 403, 404, 405 each DMA engine has an associated buffer 410, 411, 412, 413. Conceptually, each DMA engine has a pointer 406, a limit for that pointer 407, a next pointer 408, and a limit for the next pointer 409. Each DMA engine is dedicated to a particular type of information, for example, video 402, audio 403, and parsed events 405. The buffers 410, 411, 412, 413 are circular and collect the specific information. The DMA engine increments the pointer 406 into the associated buffer until it reaches the limit 407 and then loads the next pointer 408 and limit 409. Setting the pointer 406 and next pointer 408 to the same value, along with the corresponding

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limit value creates a circular buffer. The next pointer 408 can be set to a different address to provide vector DMA.

The input stream flows through a parser 401. The parser 401 parses the stream looking for MPEG distinguished events indicating the start of video, audio or private data segments. For example, when the parser 401 finds a video event, it directs the stream to the video DMA engine 402. The parser 401 buffers up data and DMAs it into the video buffer 410 through the video DMA engine 402. At the same time, the parser 401 directs an event to the event DMA engine 405 which generates an event into the event buffer 413. When the parser 401 sees an audio event, it redirects the byte stream to the audio DMA engine 403 and generates an event into the event buffer 413. Similarly, when the parser 401 sees a private data event, it directs the byte stream to the private data DMA engine 404 and directs an event to the event buffer 413. The Media Switch notifies the program logic via an interrupt mechanism when events are placed in the event buffer.

Referring to FIGS. 4 and 5, the event buffer 413 is filled by the parser 401 with events. Each event 501 in the event buffer has an offset 502, event type 503, and time stamp field 504. The parser 401 provides the type and offset of each event as it is placed into the buffer. For example, when an audio event occurs, the event type field is set to an audio event and the offset indicates the location in the audio buffer 411. The program logic knows where the audio buffer 411 starts and adds the offset to find the event in the stream. The address offset 502 tells the program logic where the next event occurred, but not where it ended. The previous event is cached so the end of the current event can be found as well as the length of the segment.

With respect to FIGS. 5 and 6, the program logic reads accumulated events in the event buffer 602 when it is interrupted by the Media Switch 601. From these events the program logic generates a sequence of logical segments 603 which correspond to the parsed MPEG segments 615. The program logic converts the offset 502 into the actual address 610 of each segment, and records the event length 609 using the last cached event. If the stream was produced by encoding an analog signal, it will not contain Program Time Stamp (PTS) values, which are used by the decoders to properly present the resulting output. Thus, the program logic uses the generated time stamp 504 to calculate a simulated PTS for each segment and places that into the logical segment time stamp 607. In the case of a digital TV stream, PTS values are already encoded in the stream. The program logic extracts this information and places it in the logical segment time stamp 607.

The program logic continues collecting logical segments 603 until it reaches the fixed buffer size. When this occurs, the program logic generates a new buffer, called a Packetized Elementary Stream (PES) 605 buffer containing these logical segments 603 in order, plus ancillary control information. Each logical segment points 604 directly to the circular buffer, e.g., the video buffer 613, filled by the Media Switch 601. This new buffer is then passed to other logic components, which may further process the stream in the buffer in some way, such as presenting it for decoding or writing it to the storage media. Thus, the MPEG data is not copied from one location in memory to another by the processor. This results in a more cost effective design since lower memory bandwidth and processor bandwidth is required.

A unique feature of the MPEG stream transformation into PES buffers is that the data associated with logical segments

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need not be present in the buffer itself, as presented above. When a PES buffer is written to storage, these logical segments are written to the storage medium in the logical order in which they appear. This has the effect of gathering components of the stream, whether they be in the video, audio or private data circular buffers, into a single linear buffer of stream data on the storage medium. The buffer is read back from the storage medium with a single transfer from the storage media, and the logical segment information is updated to correspond with the actual locations in the buffer 606. Higher level program logic is unaware of this transformation, since it handles only the logical segments, thus stream data is easily managed without requiring that the data ever be copied between locations in DRAM by the CPU.

A unique aspect of the Media Switch is the ability to handle high data rates effectively and inexpensively. It performs the functions of taking video and audio data in, sending video and audio data out, sending video and audio data to disk, and extracting video and audio data from the disk on a low cost platform. Generally, the Media Switch runs asynchronously and autonomously with the microprocessor CPU, using its DMA capabilities to move large quantities of information with minimal intervention by the CPU.

Referring to FIG. 7, the input side of the Media Switch 701 is connected to an MPEG encoder 703. There are also circuits specific to MPEG audio 704 and vertical blanking interval (VBI) data 702 feeding into the Media Switch 701. If a digital TV signal is being processed instead, the MPEG encoder 703 is replaced with an MPEG2 Transport Demultiplexor, and the MPEG audio encoder 704 and VBI decoder 702 are deleted. The demultiplexor multiplexes the extracted audio, video and private data channel streams through the video input Media Switch port.

The parser 705 parses the input data stream from the MPEG encoder 703, audio encoder 704 and VBI decoder 702, or from the transport demultiplexor in the case of a digital TV stream. The parser 705 detects the beginning of all of the important events in a video or audio stream, the start of all of the frames, the start of sequence headers—all of the pieces of information that the program logic needs to know about in order to both properly play back and perform special effects on the stream, e.g. fast forward, reverse, play, pause, fast/slow play, indexing, and fast/slow reverse play.

The parser 705 places tags 707 into the FIFO 706 when it identifies video or audio segments, or is given private data. The DMA 709 controls when these tags are taken out. The tags 707 and the DMA addresses of the segments are placed into the event queue 708. The frame type information, whether it is a start of a video I-frame, video B-frame, video P-frame, video PES, audio PES, a sequence header, an audio frame, or private data packet, is placed into the event queue 708 along with the offset in the related circular buffer where the piece of information was placed. The program logic operating in the CPU 713 examines events in the circular buffer after it is transferred to the DRAM 714.

The Media Switch 701 has a data bus 711 that connects to the CPU 713 and DRAM 714. An address bus 712 is also shared between the Media Switch 701, CPU 713, and DRAM 714. A hard disk or storage device 710 is connected to one of the ports of the Media Switch 701. The Media Switch 701 outputs streams to an MPEG video decoder 715 and a separate audio decoder 717. The audio decoder 717 signals contain audio cues generated by the system in response to the user's commands on a remote control or

other internal events. The decoded audio output from the MPEG decoder is digitally mixed 718 with the separate audio signal. The resulting signals contain video, audio, and on-screen displays and are sent to the TV 716.

The Media Switch 701 takes in 8-bit data and sends it to the disk, while at the same time extracts another stream of data off of the disk and sends it to the MPEG decoder 715. All of the DMA engines described above can be working at the same time. The Media Switch 701 can be implemented in hardware using a Field Programmable Gate Array (FPGA), ASIC, or discrete logic.

Rather than having to parse through an immense data stream looking for the start of where each frame would be, the program logic only has to look at the circular event buffer in DRAM 714 and it can tell where the start of each frame is and the frame type. This approach saves a large amount of CPU power, keeping the real time requirements of the CPU 713 small. The CPU 713 does not have to be very fast at any point in time. The Media Switch 701 gives the CPU 713 as much time as possible to complete tasks. The parsing mechanism 705 and event queue 708 decouple the CPU 713 from parsing the audio, video, and buffers and the real time nature of the streams, which allows for lower costs. It also allows the use of a bus structure in a CPU environment that operates at a much lower clock rate with much cheaper memory than would be required otherwise.

The CPU 713 has the ability to queue up one DMA transfer and can set up the next DMA transfer at its leisure. This gives the CPU 713 large time intervals within which it can service the DMA controller 709. The CPU 713 may respond to a DMA interrupt within a larger time window because of the large latency allowed. MPEG streams, whether extracted from an MPEG2 Transport or encoded from an analog TV signal, are typically encoded using a technique called Variable Bit Rate encoding (VBR). This technique varies the amount of data required to represent a sequence of images by the amount of movement between those images. This technique can greatly reduce the required bandwidth for a signal, however sequences with rapid movement (such as a basketball game) may be encoded with much greater bandwidth requirements. For example, the Hughes DirecTV satellite system encodes signals with anywhere from 1 to 10 Mb/s of required bandwidth, varying from frame to frame. It would be difficult for any computer system to keep up with such rapidly varying data rates without this structure.

With respect to FIG. 8, the program logic within the CPU has three conceptual components: sources 801, transforms 802, and sinks 803. The sources 801 produce buffers of data. Transforms 802 process buffers of data and sinks 803 consume buffers of data. A transform is responsible for allocating and queuing the buffers of data on which it will operate. Buffers are allocated as if "empty" to sources of data, which give them back "full". The buffers are then queued and given to sinks as "full", and the sink will return the buffer "empty".

A source 801 accepts data from encoders, e.g., a digital satellite receiver. It acquires buffers for this data from the downstream transform, packages the data into a buffer, then pushes the buffer down the pipeline as described above. The source object 801 does not know anything about the rest of the system. The sink 803 consumes buffers, taking a buffer from the upstream transform, sending the data to the decoder, and then releasing the buffer for reuse.

There are two types of transforms 802 used: spatial and temporal. Spatial transforms are transforms that perform, for

example, an image convolution or compression/decompression on the buffered data that is passing through. Temporal transforms are used when there is no time relation that is expressible between buffers going in and buffers coming out of a system. Such a transform writes the buffer to a file 804 on the storage medium. The buffer is pulled out at a later time, sent down the pipeline, and properly sequenced within the stream.

Referring to FIG. 9, a C++ class hierarchy derivation of the program logic is shown. The TiVo Media Kernel (Tmk) 904, 908, 913 mediates with the operating system kernel. The kernel provides operations such as: memory allocation, synchronization, and threading. The TmkCore 904, 908, 913 structures memory taken from the media kernel as an object. It provides operators, new and delete, for constructing and deconstructing the object. Each object (source 901, transform 902, and sink 903) is multi-threaded by definition and can run in parallel.

The TmkPipeline class 905, 909, 914 is responsible for flow control through the system. The pipelines point to the next pipeline in the flow from source 901 to sink 903. To pause the pipeline, for example, an event called "pause" is sent to the first object in the pipeline. The event is relayed on to the next object and so on down the pipeline. This all happens asynchronously to the data going through the pipeline. Thus, similar to applications such as telephony, control of the flow of MPEG streams is asynchronous and separate from the streams themselves. This allows for a simple logic design that is at the same time powerful enough to support the features described previously, including pause, rewind, fast forward and others. In addition, this structure allows fast and efficient switching between stream sources, since buffered data can be simply discarded and decoders reset using a single event, after which data from the new stream will pass down the pipeline. Such a capability is needed, for example, when switching the channel being captured by the input section, or when switching between a live signal from the input section and a stored stream.

The source object 901 is a TmkSource 906 and the transform object 902 is a TmkXfrm 910. These are intermediate classes that define standard behaviors for the classes in the pipeline. Conceptually, they handshake buffers down the pipeline. The source object 901 takes data out of a physical data source, such as the Media Switch, and places it into a PES buffer. To obtain the buffer, the source object 901 asks the down stream object in his pipeline for a buffer (allocEmptyBuf). The source object 901 is blocked until there is sufficient memory. This means that the pipeline is self-regulating; it has automatic flow control. When the source object 901 has filled up the buffer, it hands it back to the transform 902 through the pushFullBuf function.

The sink 903 is flow controlled as well. It calls nextFullBuf which tells the transform 902 that it is ready for the next filled buffer. This operation can block the sink 903 until a buffer is ready. When the sink 903 is finished with a buffer (i.e., it has consumed the data in the buffer) it calls releaseEmptyBuf. ReleaseEmptyBuf gives the buffer back to the transform 902. The transform 902 can then hand that buffer, for example, back to the source object 901 to fill up again. In addition to the automatic flow-control benefit of this method, it also provides for limiting the amount of memory dedicated to buffers by allowing enforcement of a fixed allocation of buffers by a transform. This is an important feature in achieving a cost-effective limited DRAM environment.

The MediaSwitch class 909 calls the allocEmptyBuf method of the TmkClipCache 912 object and receives a PES

buffer from it. It then goes out to the circular buffers in the Media Switch hardware and generates PES buffers. The MediaSwitch class 909 fills the buffer up and pushes it back to the TmkClipCache 912 object.

The TmkClipCache 912 maintains a cache file 918 on a storage medium. It also maintains two pointers into this cache: a push pointer 919 that shows where the next buffer coming from the source 901 is inserted; and a current pointer 920 which points to the current buffer used.

The buffer that is pointed to by the current pointer is handed to the Vela decoder class 916. The Vela decoder class 916 talks to the decoder 921 in the hardware. The decoder 921 produces a decoded TV signal that is subsequently encoded into an analog TV signal in NTSC, PAL or other analog format. When the Vela decoder class 916 is finished with the buffer it calls releaseEmptyBuf.

The structure of the classes makes the system easy to test and debug. Each level can be tested separately to make sure it performs in the appropriate manner, and the classes may be gradually aggregated to achieve the desired functionality while retaining the ability to effectively test each object.

The control object 917 accepts commands from the user and sends events into the pipeline to control what the pipeline is doing. For example, if the user has a remote control and is watching TV, the user presses pause and the control object 917 sends an event to the sink 903, that tells it pause. The sink 903 stops asking for new buffers. The current pointer 920 stays where it is at. The sink 903 starts taking buffers out again when it receives another event that tells it to play. The system is in perfect synchronization; it starts from the frame that it stopped at.

The remote control may also have a fast forward key. When the fast forward key is pressed, the control object 917 sends an event to the transform 902, that tells it to move forward two seconds. The transform 902 finds that the two second time span requires it to move forward three buffers. It then issues a reset event to the downstream pipeline, so that any queued data or state that may be present in the hardware decoders is flushed. This is a critical step, since the structure of MPEG streams requires maintenance of state across multiple frames of data, and that state will be rendered invalid by repositioning the pointer. It then moves the current pointer 920 forward three buffers. The next time the sink 903 calls nextFullBuf it gets the new current buffer. The same method works for fast reverse in that the transform 902 moves the current pointer 920 backwards.

A system clock reference resides in the decoder. The system clock reference is sped up for fast play or slowed down for slow play. The sink simply asks for full buffers faster or slower, depending on the clock speed.

With respect to FIG. 10, two other objects derived from the TmkXfrm class are placed in the pipeline for disk access. One is called TmkClipReader 1003 and the other is called TmkClipWriter 1001. Buffers come into the TmkClipWriter 1001 and are pushed to a file on a storage medium 1004. TmkClipReader 1003 asks for buffers which are taken off of a file on a storage medium 1005. A TmkClipReader 1003 provides only the allocEmptyBuf and pushFullBuf methods, while a TmkClipWriter 1001 provides only the nextFullBuf and releaseEmptyBuf methods. A TmkClipReader 1003 therefore performs the same function as the input, or "push" side of a TmkClipCache 1002, while a TmkClipWriter 1001 therefore performs the same function as the output, or "pull" side of a TmkClipCache 1002.

Referring to FIG. 11, a preferred embodiment that accomplishes multiple functions is shown. A source 1101 has a TV

signal input. The source sends data to a PushSwitch 1102 which is a transform derived from TmkXfrm. The Push-Switch 1102 has multiple outputs that can be switched by the control object 1114. This means that one part of the pipeline can be stopped and another can be started at the users whim. The user can switch to different storage devices. The Push-Switch 1102 could output to a TmkClipWriter 1106, which goes onto a storage device 1107 or write to the cache transform 1103.

An important feature of this apparatus is the ease with which it can selectively capture portions of an incoming signal under the control of program logic. Based on information such as the current time, or perhaps a specific time span, or perhaps via a remote control button press by the viewer, a TmkClipWriter 1106 may be switched on to record a portion of the signal, and switched off at some later time. This switching is typically caused by sending a "switch" event to the PushSwitch 1102 object.

An additional method for triggering selective capture is through information modulated into the VBI or placed into an MPEG private data channel. Data decoded from the VBI or private data channel is passed to the program logic. The program logic examines this data to determine if the data indicates that capture of the TV signal into which it was modulated should begin. Similarly, this information may also indicate when recording should end, or another data item may be modulated into the signal indicating when the capture should end. The starting and ending indicators may be explicitly modulated into the signal or other information that is placed into the signal in a standard fashion may be used to encode this information.

With respect to FIG. 12, an example is shown which demonstrates how the program logic scans the words contained within the closed caption (CC) fields to determine starting and ending times, using particular words or phrases to trigger the capture. A stream of NTSC or PAL fields 1201 is presented. CC bytes are extracted from each odd field 1202, and entered in a circular buffer 1203 for processing by the Word Parser 1204. The Word Parser 1204 collects characters until it encounters a word boundary, usually a space, period or other delineating character. Recall from above, that the MPEG audio and video segments are collected into a series of fixed-size PES buffers. A special segment is added to each PES buffer to hold the words extracted from the CC field 1205. Thus, the CC information is preserved in time synchronization with the audio and video, and can be correctly presented to the viewer when the stream is displayed. This also allows the stored stream to be processed for CC information at the leisure of the program logic, which spreads out load, reducing cost and improving efficiency. In such a case, the words stored in the special segment are simply passed to the state table logic 1206.

During stream capture, each word is looked up in a table 1206 which indicates the action to take on recognizing that word. This action may simply change the state of the recognizer state machine 1207, or may cause the state machine 1207 to issue an action request, such as "start capture", "stop capture", "phrase seen", or other similar requests. Indeed, a recognized word or phrase may cause the pipeline to be switched; for example, to overlay a different audio track if undesirable language is used in the program.

Note that the parsing state table 1206 and recognizer state machine 1207 may be modified or changed at any time. For example, a different table and state machine may be provided for each input channel. Alternatively, these elements may be switched depending on the time of day, or because of other events.

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Referring to FIG. 11, a PullSwitch is added 1104 which outputs to the sink 1105.

The sink 1105 calls nextFullBuf and releaseEmptyBuf to get or return buffers from the PullSwitch 1104. The PullSwitch 1104 can have any number of inputs. One input could be an ActionClip 1113. The remote control can switch between input sources. The control object 1114 sends an event to the PullSwitch 1104, telling it to switch. It will switch from the current input source to whatever input source the control object selects.

An ActionClip class provides for sequencing a number of different stored signals in a predictable and controllable manner, possibly with the added control of viewer selection via a remote control. Thus, it appears as a derivative of a TmkXfrm object that accepts a "switch" event for switching to the next stored signal.

This allows the program logic or user to create custom sequences of video output. Any number of video segments can be lined up and combined as if the program logic or user were using a broadcast studio video mixer. TmkClipReaders 1108, 1109, 1110 are allocated and each is hooked into the PullSwitch 1104. The PullSwitch 1104 switches between the TmkClipReaders 1108, 1109, 1110 to combine video and audio clips. Flow control is automatic because of the way the pipeline is constructed. The Push and Pull Switches are the same as video switches in a broadcast studio.

The derived class and resulting objects described here may be combined in an arbitrary way to create a number of different useful configurations for storing, retrieving, switching and viewing of TV streams. For example, if multiple input and output sections are available, one input is viewed while another is stored, and a picture-in-picture window generated by the second output is used to preview previously stored streams. Such configurations represent a unique and novel application of software transformations to achieve the functionality expected of expensive, sophisticated hardware solutions within a single cost-effective device.

With respect to FIG. 13, a high-level system view is shown which implements a VCR backup. The Output Module 1303 sends TV signals to the VCR 1307. This allows the user to record TV programs directly on to video tape. The invention allows the user to queue up programs from disk to be recorded on to video tape and to schedule the time that the programs are sent to the VCR 1307. Title pages (EPG data) can be sent to the VCR 1307 before a program is sent. Longer programs can be scaled to fit onto smaller video tapes by speeding up the play speed or dropping frames.

The VCR 1307 output can also be routed back into the Input Module 1301. In this configuration the VCR acts as a backup system for the Media Switch 1302. Any overflow storage or lower priority programming is sent to the VCR 1307 for later retrieval.

The Input Module 1301 can decode and pass to the remainder of the system information encoded on the Vertical Blanking Interval (VBI). The Output Module 1303 can encode into the output VBI data provided by the remainder of the system. The program logic may arrange to encode identifying information of various kinds into the output signal, which will be recorded onto tape using the VCR 1307. Playing this tape back into the input allows the program logic to read back this identifying information, such that the TV signal recorded on the tape is properly handled. For example, a particular program may be recorded to tape along with information about when it was recorded, the source network, etc. When this program is played back

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into the Input Module, this information can be used to control storage of the signal, presentation to the viewer, etc.

One skilled in the art will readily appreciate that such a mechanism may be used to introduce various data items to the program logic which are not properly conceived of as television signals. For instance, software updates or other data may be passed to the system. The program logic receiving this data from the television stream may impose controls on how the data is handled, such as requiring certain authentication sequences and/or decrypting the embedded information according to some previously acquired key. Such a method works for normal broadcast signals as well, leading to an efficient means of providing non-TV control information and data to the program logic.

Additionally, one skilled in the art will readily appreciate that although a VCR is specifically mentioned above, any multimedia recording device (e.g., a Digital Video Disk-Random Access Memory (DVD-RAM) recorder) is easily substituted in its place.

Although the invention is described herein with reference to the preferred embodiment, one skilled in the art will readily appreciate that other applications may be substituted for those set forth herein without departing from the spirit and scope of the present invention. For example, the invention can be used in the detection of gambling casino crime. The input section of the invention is connected to the casino's video surveillance system. Recorded video is cached and simultaneously output to external VCRs. The user can switch to any video feed and examine (i.e., rewind, play, slow play, fast forward, etc.) a specific segment of the recorded video while the external VCRs are being loaded with the real-time input video. Accordingly, the invention should only be limited by the claims included below.

What is claimed is:

1. A process for the simultaneous storage and play back of multimedia data, comprising the steps of:
  - accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC;
  - tuning said TV signals to a specific program;
  - providing at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation;
  - providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components;
  - storing said video and audio components on a storage device;
  - providing at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device;
  - wherein said Output Section assembles said video and audio components into an MPEG stream;
  - wherein said Output Section sends said MPEG stream to a decoder;
  - wherein said decoder converts said MPEG stream into TV output signals;
  - wherein said decoder delivers said TV output signals to a TV receiver; and
  - accepting control commands from a user, wherein said control commands are sent through the system and affect the flow of said MPEG stream.



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2. The process of claim 1, wherein said Input Section directs said MPEG stream to the destination indicated by said control commands.
3. The process of claim 1, wherein said Output Section extracts said video and audio components from the storage device indicated by said control commands.
4. The process of claim 1, further comprising the step of: creating custom video output sequences, wherein said sequences are specified by a user or program control.
5. The process of claim 1, wherein the storing and extracting of said video and audio components from said storage device are performed simultaneously.
6. The process of claim 1, wherein said Media Switch calculates and logically associates a time stamp to said video and audio components.
7. The process of claim 1, wherein said Media Switch extracts time stamp values from a digital TV stream and logically associates said time stamp values to said video and audio components.
8. The process of claim 1, further comprising the steps of: placing said video component into a circular video buffer; posting an event in a circular event buffer, wherein said event contains an indication that a video component was found and the location of said video component in said circular video buffer; and sending notice of said event posting.
9. The process of claim 1, further comprising the steps of: placing said audio component into a circular audio buffer; posting an event in a circular event buffer, wherein said event contains an indication that an audio component was found and the location of said audio component in said circular audio buffer; and sending notice of said event posting.
10. The process of claims 8 or 9, further comprising the steps of: receiving said notice; retrieving said event posting from said event buffer; and indexing into the appropriate buffer indicated by the type and location information in said event buffer.
11. The process of claim 10, further comprising the steps of: generating a buffer containing the logical audio or video segments in order, including ancillary information, wherein each of said logical segments points to the appropriate circular buffer location where corresponding audio or video components have been placed.
12. The process of claim 1, further comprising the step of: increasing the decoder system clock rate for fast playback or fast reverse playback.
13. The process of claim 1, further comprising the step of: decreasing the decoder system clock rate for slow playback or slow reverse playback.
14. The process of claim 1, further comprising the step of: combining system audio cues and on-screen displays with said TV output signals.
15. The process of claim 1, further comprising the steps of: decoding the Vertical Blanking Interval (VBI) data or private data channel information from said TV signal; and examining said data to determine the starting or ending indicators of a specific program.
16. The process of claim 1, further comprising the step of: scanning the words contained within the closed caption (CC) fields to determine program starting and ending

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- times, wherein particular words or phrases are used to trigger the recording of a specific program and wherein the CC information is preserved in time synchronization with the audio and video, and can be correctly presented to the viewer when the stream is displayed.
17. The process of claim 16, further comprising the step of: performing a specific action when a specific word is found in said CC information.
18. The process of claim 1, wherein said Media Switch has a data bus connecting it to a CPU and DRAM.
19. The process of claim 1, wherein said Media Switch shares an address bus with a CPU and DRAM.
20. The process of claim 1, wherein said Media Switch operates asynchronously and autonomously with a CPU.
21. The process of claim 1, wherein said storage device is connected to said Media Switch.
22. The process of claim 1, wherein said Media Switch allows the CPU to queue up Direct Memory Access (DMA) transfers.
23. The process of claim 1, wherein said Media Switch is implemented in hardware.
24. The process of claim 1, further comprising the step of: providing a multimedia recording device, including, but not limited to, a Video Cassette Recorder (VCR) or a Digital Video Disk-Random Access Memory (DVD-RAM) device, wherein said recording device is attached to the output side of said decoder, allowing said user to record said TV output signals.
25. The process of claim 24, wherein said user queues up programs from said storage device to be stored on said recording device.
26. The process of claim 24, wherein said user sets time schedules for said programs to be sent to said recording device.
27. The process of claim 24, wherein title pages may be sent to said recording device before sending a program to be stored on said recording device.
28. The process of claim 24, wherein a program that is longer in duration than a magnetic tape in said recording device allows, is sped up to fit within the desired time limit.
29. The process of claim 24, wherein a program that is longer in duration than a magnetic tape in said recording device allows, has frames dropped from it to fit within the desired time limit.
30. The process of claim 24, wherein the output of said recording device is routed to said Input Section, allowing said recording device to act as a storage back up system, said recording device accepts overflow storage, TV programs, software updates, or other data that are later retrieved and sent to said Input Section.
31. A process for the simultaneous storage and play back of multimedia data, comprising the steps of: providing a physical data source, wherein said physical data source accepts broadcast data from an input device, parses video and audio data from said broadcast data, and temporarily stores said video and audio data; providing a source object, wherein said source object extracts video and audio data from said physical data source; providing a transform object, wherein said transform object stores and retrieves data streams onto a storage device; wherein said source object obtains a buffer from said transform object, said source object converts video data into data streams and fills said buffer with said streams;

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wherein said source object is automatically flow controlled by said transform object;

providing a sink object, wherein said sink object obtains data stream buffers from said transform object and outputs said streams to a video and audio decoder;

wherein said decoder converts said streams into display signals and sends said signals to a display;

wherein said sink object is automatically flow controlled by said transform object;

providing a control object, wherein said control object receives commands from a user, said commands control the flow of the broadcast data through the system; and

wherein said control object sends flow command events to said source, transform, and sink objects.

32. An apparatus for the simultaneous storage and playback of multimedia data, comprising:

a module for accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC;

a module for tuning said TV signals to a specific program;

at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation;

a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components;

a module for storing said video and audio components on a storage device;

at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device;

wherein said Output Section assembles said video and audio components into an MPEG stream;

wherein said Output Section sends said MPEG stream to a decoder;

wherein said decoder converts said MPEG stream into TV output signals;

wherein said decoder delivers said TV output signals to a TV receiver; and

accepting control commands from a user, wherein said control commands are sent through the system and affect the flow of said MPEG stream.

33. The apparatus of claim 32, wherein said Input Section directs said MPEG stream to the destination indicated by said control commands.

34. The apparatus of claim 32, wherein said Output Section extracts said video and audio components from the storage device indicated by said control commands.

35. The apparatus of claim 32, further comprising:

a module for creating custom video output sequences, wherein said sequences are specified by a user or program control.

36. The apparatus of claim 32, wherein the storing and extracting of said video and audio components from said storage device are performed simultaneously.

37. The apparatus of claim 32, wherein said Media Switch calculates and logically associates a time stamp to said video and audio components.

38. The apparatus of claim 32, wherein said Media Switch extracts time stamp values from a digital TV stream and

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logically associates said time stamp values to said video and audio components.

39. The apparatus of claim 32, further comprising:

a module for placing said video component into a circular video buffer;

a module for posting an event in a circular event buffer, wherein said event contains an indication that a video component was found and the location of said video component in said circular video buffer; and

a module for sending notice of said event posting.

40. The apparatus of claim 32, further comprising:

a module for placing said audio component into a circular audio buffer;

a module for posting an event in a circular event buffer, wherein said event contains an indication that an audio component was found and the location of said audio component in said circular audio buffer; and

a module for sending notice of said event posting.

41. The apparatus of claims 39 or 40, further comprising:

a module for receiving said notice;

a module for retrieving said event posting from said event buffer; and

a module for indexing into the appropriate buffer indicated by the type and location information in said event buffer.

42. The apparatus of claim 41, further comprising:

a module for generating a buffer containing the logical audio or video segments in order, including ancillary information, wherein each of said logical segments points to the appropriate circular buffer location where corresponding audio or video components have been placed.

43. The apparatus of claim 32, further comprising:

a module for increasing the decoder system clock rate for fast playback or fast reverse playback.

44. The apparatus of claim 32, further comprising:

a module for decreasing the decoder system clock rate for slow playback or slow reverse playback.

45. The apparatus of claim 32, further comprising:

a module for combining system audio cues and on-screen displays with said TV output signals.

46. The apparatus of claim 32, further comprising:

a module for decoding the Vertical Blanking Interval (VBI) data or private data channel information from said TV signal; and

a module for examining said data to determine the starting or ending indicators of a specific program.

47. The apparatus of claim 32, further comprising:

a module for scanning the words contained within the closed caption (CC) fields to determine program starting and ending times, wherein particular words or phrases are used to trigger the recording of a specific program and wherein the CC information is preserved in time synchronization with the audio and video, and can be correctly presented to the viewer when the stream is displayed.

48. The apparatus of claim 47, further comprising:

a module for performing a specific action when a specific word is found in said CC information.

49. The apparatus of claim 32, wherein said Media Switch has a data bus connecting it to a CPU and DRAM.

50. The apparatus of claim 32, wherein said Media Switch shares an address bus with a CPU and DRAM.

51. The apparatus of claim 32, wherein said Media Switch operates asynchronously and autonomously with a CPU.

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52. The apparatus of claim 32, wherein said storage device is connected to said Media Switch.

53. The apparatus of claim 32, wherein said Media Switch allows the CPU to queue up Direct Memory Access (DMA) transfers.

54. The apparatus of claim 32, further comprising:  
a multimedia recording device, including, but not limited to, a Video Cassette Recorder (VCR) or a Digital Video Disk-Random Access Memory (DVD-RAM) device, wherein said recording device is attached to the output side of said decoder, allowing said user to record said TV output signals.

55. The apparatus of claim 54, wherein said user queues up programs from said storage device to be stored on said recording device.

56. The apparatus of claim 54, wherein said user sets time schedules for said programs to be sent to said recording device.

57. The apparatus of claim 54, wherein title pages may be sent to said recording device before sending a program to be stored on said recording device.

58. The apparatus of claim 54, wherein a program that is longer in duration than a magnetic tape in said recording device allows, is sped up to fit within the desired time limit.

59. The apparatus of claim 54, wherein a program that is longer in duration than a magnetic tape in said recording device allows, has frames dropped from it to fit within the desired time limit.

60. The apparatus of claim 54, wherein the output of said recording device is routed to said Input Section, allowing said recording device to act as a storage back up system, said recording device accepts overflow storage, TV programs,

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software updates, or other data that are later retrieved and sent to said Input Section.

61. An apparatus for the simultaneous storage and play back of multimedia data, comprising:

5 a physical data source, wherein said physical data source accepts broadcast data from an input device, parses video and audio data from said broadcast data, and temporarily stores said video and audio data;

10 a source object, wherein said source object extracts video and audio data from said physical data source;

a transform object, wherein said transform object stores and retrieves data streams onto a storage device;

15 wherein said source object obtains a buffer from said transform object, said source object converts video data into data streams and fills said buffer with said streams; wherein said source object is automatically flow controlled by said transform object;

20 a sink object, wherein said sink object obtains data stream buffers from said transform object and outputs said streams to a video and audio decoder;

wherein said decoder converts said streams into display signals and sends said signals to a display;

25 wherein said sink object is automatically flow controlled by said transform object;

30 a control object, wherein said control object receives commands from a user, said commands control the flow of the broadcast data through the system; and wherein said control object sends flow command events to said source, transform, and sink objects.

\* \* \* \* \*

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|   |   |    | Patent Number            | 6,233,389              |              |
|   |   |    | Issue Date               | May 15, 2001           |              |
|   |   |    | First Named Inventor     | James M. Barton        |              |
|   |   |    | Art Unit                 | Not yet assigned       |              |
|   |   |    | Examiner Name            | Not yet assigned       |              |
| Sheet   | 1 | of | 1                        | Attorney Docket Number | 454030000041 |

| U.S. PATENT DOCUMENTS |                       |  |  |                                |   |   |
|-----------------------|-----------------------|--|--|--------------------------------|---|---|
| Examiner Initials*    | Cite No. <sup>1</sup> | Document Number                          |  | Publication Date<br>MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|                       |                       | Number-Kind Code <sup>2</sup> (if known) |  |                                |   |   |
|                       | 1.                    | US-5,614,940                             |  | 03-25-1997                     | Cobbley et al.                                  | See Detailed Request  |
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| Examiner Initials*       | Cite No. <sup>1</sup> | Foreign Patent Document   |  | Publication Date<br>MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T <sup>6</sup> |
|                          |                       | Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known) |  |                                |   |   |                |
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

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Bib Data Sheet

CONFIRMATION NO. 4653

|                                    |   |                     |                               |  |
|------------------------------------|---|---------------------|-------------------------------|--|
| <b>SERIAL NUMBER</b><br>90/007,750 | <b>FILING OR 371(c) DATE</b><br>10/17/2005<br><b>RULE</b> | <b>CLASS</b><br>386 | <b>GROUP ART UNIT</b><br>3992 | <b>ATTORNEY DOCKET NO.</b><br>454030000041 |
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**APPLICANTS**  
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 David L. Fehrman, Los Angeles, CA

**\*\* CONTINUING DATA \*\*\*\*\***  
 This application is a REX of 09/126,071 07/30/1998 PAT 6,233,389


**\*\* FOREIGN APPLICATIONS \*\*\*\*\***

|   |                         |                       |                           |                                |
|---|-------------------------|-----------------------|---------------------------|--------------------------------|
| Foreign Priority claimed <input type="checkbox"/> yes <input type="checkbox"/> no   | <b>STATE OR COUNTRY</b> | <b>SHEETS DRAWING</b> | <b>TOTAL CLAIMS</b><br>61 | <b>INDEPENDENT CLAIMS</b><br>4 |
| 35 USC 119 (a-d) conditions met <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance |                         |                       |                           |                                |
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**TITLE**  
 MULTIMEDIA TIME WARPING SYSTEM

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|  | <b>Examiner</b><br>***                       | <b>Art Unit</b><br>3992                                   |  |

**Index of Claims**



Application/Control No.

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Applicant(s)/Patent under Reexamination

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Art Unit

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|  |                         |   |  |
|--|-------------------------|---|--|
| <b>Issue Classification</b><br> | Application/Control No. | Applicant(s)/Patent under Reexamination |  |
|  | 90/007,750              | 6233389                                 |  |
|  | Examiner<br>***         | Art Unit                                |  |
|  |                         | 3992                                    |  |

| ISSUE CLASSIFICATION                |          |  |   |                           |                                   |  |  |  |  |                       |  |
|-------------------------------------|----------|--|---|---------------------------|-----------------------------------|--|--|--|--|-----------------------|--|
| ORIGINAL                            |          |  |   | CROSS REFERENCE(S)        |                                   |  |  |  |  |                       |  |
| CLASS                               | SUBCLASS |  |   | CLASS                     | SUBCLASS (ONE SUBCLASS PER BLOCK) |  |  |  |  |                       |  |
| 386                                 | 046      |  |   |                           |                                   |  |  |  |  |                       |  |
| INTERNATIONAL CLASSIFICATION        |          |  |   |                           |                                   |  |  |  |  |                       |  |
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|                                     |          |  | / |                           |                                   |  |  |  |  |                       |  |
| (Assistant Examiner) (Date)         |          |  |   | (Primary Examiner) (Date) |                                   |  |  |  |  | Total Claims Allowed: |  |
| (Legal Instruments Examiner) (Date) |          |  |   |                           |                                   |  |  |  |  | O.G. Print Claim(s)   |  |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant |          |       |          |       |          |       |          |       |          | <input type="checkbox"/> CPA |          | <input type="checkbox"/> T.D. |          | <input type="checkbox"/> R.1.47 |          |
|--|----------|-------|----------|-------|----------|-------|----------|-------|----------|------------------------------|----------|-------------------------------|----------|---------------------------------|----------|
| Final  | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final                        | Original | Final                         | Original | Final                           | Original |
|  | 1        |       | 31       |       | 61       |       | 91       |       | 121      |                              | 151      |                               | 181      |                                 | 211      |
|  | 2        |       | 32       |       | 62       |       | 92       |       | 122      |                              | 152      |                               | 182      |                                 | 212      |
|  | 3        |       | 33       |       | 63       |       | 93       |       | 123      |                              | 153      |                               | 183      |                                 | 213      |
|  | 4        |       | 34       |       | 64       |       | 94       |       | 124      |                              | 154      |                               | 184      |                                 | 214      |
|  | 5        |       | 35       |       | 65       |       | 95       |       | 125      |                              | 155      |                               | 185      |                                 | 215      |
|  | 6        |       | 36       |       | 66       |       | 96       |       | 126      |                              | 156      |                               | 186      |                                 | 216      |
|  | 7        |       | 37       |       | 67       |       | 97       |       | 127      |                              | 157      |                               | 187      |                                 | 217      |
|  | 8        |       | 38       |       | 68       |       | 98       |       | 128      |                              | 158      |                               | 188      |                                 | 218      |
|  | 9        |       | 39       |       | 69       |       | 99       |       | 129      |                              | 159      |                               | 189      |                                 | 219      |
|  | 10       |       | 40       |       | 70       |       | 100      |       | 130      |                              | 160      |                               | 190      |                                 | 220      |
|  | 11       |       | 41       |       | 71       |       | 101      |       | 131      |                              | 161      |                               | 191      |                                 | 221      |
|  | 12       |       | 42       |       | 72       |       | 102      |       | 132      |                              | 162      |                               | 192      |                                 | 222      |
|  | 13       |       | 43       |       | 73       |       | 103      |       | 133      |                              | 163      |                               | 193      |                                 | 223      |
|  | 14       |       | 44       |       | 74       |       | 104      |       | 134      |                              | 164      |                               | 194      |                                 | 224      |
|  | 15       |       | 45       |       | 75       |       | 105      |       | 135      |                              | 165      |                               | 195      |                                 | 225      |
|  | 16       |       | 46       |       | 76       |       | 106      |       | 136      |                              | 166      |                               | 196      |                                 | 226      |
|  | 17       |       | 47       |       | 77       |       | 107      |       | 137      |                              | 167      |                               | 197      |                                 | 227      |
|  | 18       |       | 48       |       | 78       |       | 108      |       | 138      |                              | 168      |                               | 198      |                                 | 228      |
|  | 19       |       | 49       |       | 79       |       | 109      |       | 139      |                              | 169      |                               | 199      |                                 | 229      |
|  | 20       |       | 50       |       | 80       |       | 110      |       | 140      |                              | 170      |                               | 200      |                                 | 230      |
|  | 21       |       | 51       |       | 81       |       | 111      |       | 141      |                              | 171      |                               | 201      |                                 | 231      |
|  | 22       |       | 52       |       | 82       |       | 112      |       | 142      |                              | 172      |                               | 202      |                                 | 232      |
|  | 23       |       | 53       |       | 83       |       | 113      |       | 143      |                              | 173      |                               | 203      |                                 | 233      |
|  | 24       |       | 54       |       | 84       |       | 114      |       | 144      |                              | 174      |                               | 204      |                                 | 234      |
|  | 25       |       | 55       |       | 85       |       | 115      |       | 145      |                              | 175      |                               | 205      |                                 | 235      |
|  | 26       |       | 56       |       | 86       |       | 116      |       | 146      |                              | 176      |                               | 206      |                                 | 236      |
|  | 27       |       | 57       |       | 87       |       | 117      |       | 147      |                              | 177      |                               | 207      |                                 | 237      |
|  | 28       |       | 58       |       | 88       |       | 118      |       | 148      |                              | 178      |                               | 208      |                                 | 238      |
|  | 29       |       | 59       |       | 89       |       | 119      |       | 149      |                              | 179      |                               | 209      |                                 | 239      |
|  | 30       |       | 60       |       | 90       |       | 120      |       | 150      |                              | 180      |                               | 210      |                                 | 240      |



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|---|--|---|
| <b>Reexamination</b><br> | <b>Application/Control No.</b><br>90/007,750 | <b>Applicant(s)/Patent Under Reexamination</b><br>6233389 |
|   | <b>Certificate Date</b>                      | <b>Certificate Number</b>                                 |

**Requester Correspondence Address:**     Patent Owner     Third Party

David L. Fehrman  
 MORRISON & FOERSTER LLP  
 555 W. Fifth Street, Suite 3500  
 Los Angeles, CA 90013

|   |                     |        |
|---|---------------------|--------|
| <b>LITIGATION REVIEW</b> <input type="checkbox"/> | (examiner initials) | (date) |
| Case Name   | Director Initials   |        |
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| <b>COPENDING OFFICE PROCEEDINGS</b> |               |
|-------------------------------------|---------------|
| <b>TYPE OF PROCEEDING</b>           | <b>NUMBER</b> |
| 1.                                  |               |
| 2.                                  |               |
| 3.                                  |               |
| 4.                                  |               |

**Search Notes**



Application/Control No.

Applicant(s)/Patent under Reexamination

90/007,750

6233389

Examiner

Art Unit

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3992

**SEARCHED**

| Class | Subclass | Date | Examiner |
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**SEARCH NOTES (INCLUDING SEARCH STRATEGY)**

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## Patent Assignment Abstract of Title

**Total Assignments: 1**

**Application #:** 09126071 **Filing Dt:** 07/30/1998 **Patent #:** 6233389 **Issue Dt:** 05/15/2001

**PCT #:** NONE

**Publication #:** NONE

**Pub Dt:**

**Inventors:** JAMES M. BARTON, RODERICK JAMES MCINNIS, ALAN S. MOSKOWITZ, ANDREW MARTIN  
GOODMAN, CHING TONG CHOW, JEAN SWEY KAO

**Title:** MULTIMEDIA TIME WARPING SYSTEM

**Assignment: 1**

| <b>Reel/Frame:</b>             | <b>Received:</b> | <b>Recorded:</b> | <b>Mailed:</b> | <b>Pages:</b> |
|--------------------------------|------------------|------------------|----------------|---------------|
| <u>009377 /</u><br><u>0779</u> | 08/10/1998       | 07/30/1998       | 11/04/1998     | 2             |

**Conveyance:** ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

**Assignors:** BARTON, JAMES M.

**Exec Dt:** 07/27/1998

MCINNIS, RODERICK JAMES

**Exec Dt:** 07/21/1998

MOSKOWITZ, ALAN S.

**Exec Dt:** 07/27/1998

GOODMAN, ANDREW MARTIN

**Exec Dt:** 07/27/1998

CHOW, CHING TONG

**Exec Dt:** 07/21/1998

KAO, JEAN SWEY

**Exec Dt:** 07/24/1998

**Assignee:** TIVO, INC.

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**Correspondent:** MICHAEL A. GLENN

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Search Results as of: 10/19/2005 1:56:37 P.M.



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| REEXAM CONTROL NUMBER | FILING OR 371 (c) DATE | PATENT NUMBER |
|-----------------------|------------------------|---------------|
| 90/007,750            | 10/17/2005             | 6233389       |

David L. Fehrman  
MORRISON & FOERSTER LLP  
555 W. Fifth Street, Suite 3500  
Los Angeles, CA 90013

CONFIRMATION NO. 4653



\*OC000000017286471\*

Date Mailed: 10/20/2005

**NOTICE OF REEXAMINATION REQUEST FILING DATE**

*(Third Party Requester)*

Requester is hereby notified that the filing date of the request for reexamination is 10/17/2005, the date the required fee of \$2,520 was received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner

29989  
HICKMAN PALERMO TRUONG & BECKER, LLP  
2055 GATEWAY PLACE  
SUITE 550  
SAN JOSE, CA 95110

Office of Patent Legal Administration  
Central Reexamination Unit 571-272-7705

PART 3 - OFFICE COPY



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| REEXAM CONTROL NUMBER | FILING OR 371 (c) DATE | PATENT NUMBER |
|-----------------------|------------------------|---------------|
| 90/007,750            | 10/17/2005             | 6233389       |

29989  
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CONFIRMATION NO. 4653

## REEXAM ASSIGNMENT NOTICE



\*OC000000017286472\*

Date Mailed: 10/20/2005

## NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3992. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

cc: Third Party Requester(if any)

David L. Fehrman  
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 Los Angeles, CA 90013

Office of Patent Legal Administration  
 Central Reexamination Unit 571-272-7705

PART 3 - OFFICE COPY

# Litigation Search Report CRU 3999

Reexam Control No. 90/007,750

**TO: David Harvey**  
**Location: CRU**  
**Art Unit : 3992**  
**Date: October 31, 2005**

**From: James R. Matthews**  
**Location: CRU 3999**  
**MDW 7C76**  
**Phone: (571) 272-6278**

**Case Serial Number: 90/007,750** **JamesR.Matthews@uspto.gov**

## Search Notes

U.S. Patent No- 6,233,389

- 1) I performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.
- 2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.
- 3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.
- 4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.
- 5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

Litigation was found.



Date of Printing: OCT 31,2005

**KEYCITE****CUS PAT 6233389 MULTIMEDIA TIME WARPING SYSTEM, Assignee: TiVo, Inc. (May 15, 2001)****History**

- => 1 **MULTIMEDIA TIME WARPING SYSTEM**, US PAT 6233389, 2001 WL 510913 (U.S. PTO Utility May 15, 2001) (NO. 09/126071)

**Assignments**

- 2 Assignee(s): TIVO, INC. SUITE 100 894 ROSS DRIVE SUNNYVALE, CALIFORNIA 94089, DATE RECORDED: Jul 30, 1998

**Patent Status Files**

- . Patent Suit(See LitAlert Entries),

**Litigation Alert**

- 5 LitAlert P2004-08-19, (Jan 15, 2004) Action Taken: A complaint was filed.  
6 LitAlert P2002-10-46, (Jan 23, 2002) Action Taken: A complaint was filed.

**Prior Art**

- C** 7 US PAT 4665431 APPARATUS AND METHOD FOR RECEIVING AUDIO SIGNALS TRANSMITTED AS PART OF A TELEVISION VIDEO SIGNAL, (U.S. PTO Utility 1987)  
**C** 8 US PAT 5696868 APPARATUS AND METHOD FOR RECORDING/PLAYING BACK BROADCASTING SIGNAL, Assignee: Goldstar Co., Ltd., (U.S. PTO Utility 1997)  
**C** 9 US PAT 5550594 APPARATUS AND METHOD FOR SYNCHRONIZING ASYNCHRONOUS SIGNALS, Assignee: Pixel Instruments Corp., (U.S. PTO Utility 1996)  
**C** 10 US PAT 5675388 APPARATUS AND METHOD FOR TRANSMITTING AUDIO SIGNALS AS PART OF A TELEVISION VIDEO SIGNAL, (U.S. PTO Utility 1997)  
**C** 11 US PAT 5202761 AUDIO SYNCHRONIZATION APPARATUS, (U.S. PTO Utility 1993)  
**C** 12 US PAT RE33535 AUDIO TO VIDEO TIMING EQUALIZER METHOD AND APPARATUS, (U.S. PTO Reissue 1991)  
**C** 13 US PAT 5572261 AUTOMATIC AUDIO TO VIDEO TIMING MEASUREMENT DEVICE AND METHOD, (U.S. PTO Utility 1996)  
**C** 14 US PAT 4313135 METHOD AND APPARATUS FOR PRESERVING OR RESTORING AUDIO TO VIDEO SYNCHRONIZATION, (U.S. PTO Utility 1982)  
**C** 15 US PAT 5937138 : METHOD AND AN APPARATUS FOR SYSTEM ENCODING BITSTREAMS FOR SEAMLESS CONNECTION, Assignee: Matsushita Electric Industrial Co., Ltd., (U.S. PTO Utility 1999)  
16 US PAT 5787225 OPTICAL DISK APPARATUS FOR THE REPRODUCTION OF COMPRESSED DATA, Assignee: Matsushita Electric Industrial Co., Ltd., (U.S. PTO Utility 1998)  
17 US PAT 5706388 RECORDING SYSTEM RECORDING RECEIVED INFORMATION ON A RECORDING MEDIUM WHILE REPRODUCING RECEIVED INFORMATION PREVIOUSLY RECORDED ON THE RECORDING MEDIUM, Assignee: Ricoh Company, Ltd., (U.S. PTO Utility 1998)

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- C** 18 US PAT 5920842 : SIGNAL SYNCHRONIZATION, Assignee: Pixel Instruments, (U.S. PTO Utility 1999)
- C** 19 US PAT 5371551 TIME DELAYED DIGITAL VIDEO SYSTEM USING CONCURRENT RECORDING AND PLAYBACK, (U.S. PTO Utility 1994)
- C** 20 US PAT 5438423 TIME WARPING FOR VIDEO VIEWING, Assignee: Tektronix, Inc., (U.S. PTO Utility 1995)

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**Docket**

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**US District Court Civil Docket**

**U.S. District - Texas Eastern  
(Marshall)**

**2:04cv1**

**Tivo Inc v. Echostar Comm, et al**

This case was retrieved from the court on Monday, October 31, 2005

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|  |   |
|--|---|
| <b>Date Filed:</b> 01/05/2004          | <b>Class Code:</b> JURY, MREFHM, PATENT |
| <b>Assigned To:</b> Judge David Folsom | <b>Closed:</b> no                       |
| <b>Referred To:</b>                    | <b>Statute:</b> 35:271                  |
| <b>Nature of suit:</b> Patent (830)    | <b>Jury Demand:</b> Both                |
| <b>Cause:</b> Patent Infringement      | <b>Demand Amount:</b> \$0               |
| <b>Lead Docket:</b> None               | <b>NOS Description:</b> Patent          |
| <b>Other Docket:</b> 5:05-cv-00081-DF  |   |
| <b>Jurisdiction:</b> Federal Question  |   |

**Litigants**

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| <input type="checkbox"/> | Runner       | 01/05/2004 | --  | Demand for jury trial by TIVO Inc (poa) (Entered: 01/07/2004)   |
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| <input type="checkbox"/> | Online       | 01/20/2004 | 4   | Return of service executed as to Echostar DBS Corp 1/12/04 Answer due on 2/2/04 for Echostar Corp (ktd) Additional attachment(s) added on 1/28/2005 (ehs, ). (Entered: 01/21/2004)  |
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| <input type="checkbox"/> | Online       | 01/26/2004 | 7   | Return of service executed as to EchoStar Tech Corp, Echosphere Ltd Liab 1/16/04 Answer due on 2/5/04 for EchoStar Tech Corp, for Echosphere Ltd Liab (ktd) Additional attachment(s) 1/28/2005 (ehs, ). (Entered: 01/27/2004) |
| <input type="checkbox"/> | Online       | 01/29/2004 | 8   | Secty's Return of service executed as to Echostar DBS Corp 1/20/04 Answer due on 2/2/04 for DBS Corp (ktd) Additional attachment(s) added on 1/28/2005 (ehs, ). (Entered: 01/30/2004)   |
| <input type="checkbox"/> | Online       | 01/29/2004 | 9   | Secty's Return of service executed as to Echostar Comm 1/20/04 Answer due on 2/9/04 for Comm (ktd) Additional attachment(s) added on 1/28/2005 (ehs, ). (Entered: 01/30/2004)   |
| <input type="checkbox"/> | Online       | 02/04/2004 | 10  | Secretary of State certificate of service served upon Echosphere Ltd Liab on 1/28/04 (1/28/04) (02/04/2004)   |
| <input type="checkbox"/> | Online       | 02/05/2004 | 11  | Stipulation to extend time to close of business on 3/1/04 for dft's answer or response (02/05/2004)   |
| <input type="checkbox"/> | Online       | 02/09/2004 | 12  | Secretary's Return of Service Executed as to EchoStar Technologies Corporation by c/r 1/27/2004, answer due: 2/16/2004. (ktd, ) (Entered: 02/13/2004)   |



|                          |        |            |    |  |
|--------------------------|--------|------------|----|--|
| <input type="checkbox"/> | Online | 02/27/2004 | 13 | APPLICATION to Appear Pro Hac Vice by Attorney Rachel Krevans for Echostar Commu Corporation; Echostar DBS Corporation; EchoStar Technologies Corporation and Echos Liability Company. (ktd, ) (Entered: 03/01/2004)   |
| <input type="checkbox"/> | Online | 02/27/2004 | 14 | APPLICATION to Appear Pro Hac Vice by Attorney Zachariah A. Higgins for Echostar Co Corporation; Echostar DBS Corporation; EchoStar Technologies Corporation and Echos Liability Company. (ktd, ) (Entered: 03/01/2004)  |
| <input type="checkbox"/> | Online | 02/27/2004 | 15 | APPLICATION to Appear Pro Hac Vice by Attorney Paul A. Friedman for Echostar Comm Corporation; Echostar DBS Corporation; EchoStar Technologies Corporation and Echos Liability Company. (ktd, ) (Entered: 03/01/2004)  |
| <input type="checkbox"/> | Online | 02/27/2004 | 16 | APPLICATION to Appear Pro Hac Vice by Attorney Harold J. McElhinny for Echostar Con Corporation; Echostar DBS Corporation; EchoStar Technologies Corporation and Echos Liability Company. (ktd, ) (Entered: 03/01/2004)  |
| <input type="checkbox"/> | Runner | 03/01/2004 | -- | Pro Hac Vice Filing fee paid by McElhinny; Krevans; Higgins; Friedman; Fee: \$100., rec 102101 (ktd, ) (Entered: 03/01/2004)   |
| <input type="checkbox"/> | Online | 03/01/2004 | 17 | CORPORATE DISCLOSURE STATEMENT filed by EchoStar Technologies Corporation, Ecl Liability Company, Echostar Communications Corporation, Echostar DBS Corporation (l 03/02/2004)   |
| <input type="checkbox"/> | Online | 03/01/2004 | 18 | Filed in Texarkana ANSWER to Amended Complaint ; COUNTERCLAIM against TIVO Inc relief of invalidity, non-infringement and unenforceability by EchoStar Technologies Co Echosphere Limited Liability Company.(ktd, ) (Entered: 03/02/2004)                        |
| <input type="checkbox"/> | Online | 03/01/2004 | 19 | MOTION to Change Venue to the Northern District Of California, MOTION to Dismiss by Technologies Corporation, Echosphere Limited Liability Company, Echostar Communica Corporation, Echostar DBS Corporation. (poa, ) (Entered: 03/02/2004)                      |
| <input type="checkbox"/> | Online | 03/05/2004 | 20 | REPLY to 18 Answer to Amended Complaint, Counterclaim by TIVO Inc. (poa, ) (Entere   |
| <input type="checkbox"/> | Online | 03/05/2004 | 21 | APPLICATION to Appear Pro Hac Vice by Attorney Richard E Lyon for TIVO Inc, Perry M TIVO Inc, Ben Yorks for TIVO Inc, Morgan Chu for TIVO Inc. (ktd, ) (Entered: 03/09/20  |
| <input type="checkbox"/> | Runner | 03/05/2004 | -- | Pro Hac Vice Filing fee paid by Chu; Goldberg; Yorks; Lyon; Fee: \$100., receipt numbe (Entered: 03/09/2004)   |
| <input type="checkbox"/> | Online | 03/16/2004 | 22 | APPLICATION to Appear Pro Hac Vice by Attorney Adam S. Hoffman for TIVO Inc and T (Entered: 03/17/2004)  |
| <input type="checkbox"/> | Runner | 03/16/2004 | -- | Pro Hac Vice Filing fee paid by Adam S Hoffman; Fee: \$25, receipt number: 102267 (n 03/17/2004)   |
| <input type="checkbox"/> | Online | 03/17/2004 | 23 | MOTION for Leave to exceed page limit for pltf to file its oppositions to defts' motion tc dismiss by TIVO Inc. (mll, ) (Entered: 03/22/2004)  |
| <input type="checkbox"/> | Online | 03/26/2004 | 24 | ORDER granting 23 Motion for Leave to File Excess Pages for its oppositions to dfts' mc or dismiss. Signed by Judge David Folsom on 3/24/04. (ktd, ) (Entered: 03/26/2004)   |
| <input type="checkbox"/> | Online | 03/26/2004 | 25 | RESPONSE in Opposition re 19 MOTION to Change Venue filed by TIVO Inc.(exhibits nc (ktd, ) (Entered: 03/26/2004)   |
| <input type="checkbox"/> | Online | 03/26/2004 | 26 | RESPONSE in Opposition re 19 MOTION to Dismiss filed by TIVO Inc. (ktd, ) (Exhibits r Modified on 3/26/2004 (ktd, ). Additional attachment(s) added on 2/15/2005 (ehs, ). ( 03/26/2004)  |
| <input type="checkbox"/> | Online | 04/05/2004 | 27 | AGREED MOTION for Defendants to File Replies to Plaintiff's Oppositions to Defendant': Transfer and Dismiss, by EchoStar Technologies Corporation, Echosphere Limited Liabi Echostar Communications Corporation, Echostar DBS Corporation. (kjr, ) (Entered: 04, |
| <input type="checkbox"/> | Online | 04/05/2004 | 28 | REPLY to Response to Motion re 19 MOTION to Change Venue MOTION to Dismiss filed defendants. (ktd, ) (Entered: 04/07/2004)   |
| <input type="checkbox"/> | Online | 04/05/2004 | 29 | REPLY to Response to Motion re 19 MOTION to Change Venue MOTION to Dismiss filed defendants". (ktd, ) (Entered: 04/07/2004)  |
| <input type="checkbox"/> | Online | 04/12/2004 | 30 | AGREED MOTION for Leave to File Excess Pages for TIVO's Sur-Reply in Support of its Motion to Dismiss, by TIVO Inc. (kjr, ) (Entered: 04/13/2004)  |
| <input type="checkbox"/> | Online | 04/12/2004 | 32 | SUR-REPLY in Support of Opposition to Motion re 19 MOTION to Change Venue, filed b (Entered: 04/13/2004)   |
| <input type="checkbox"/> | Online | 04/13/2004 | 31 | ORDER granting 27 Dfts' Motion for Leave to File Excess Pages for Replies to Plaintiff's Dfts' Motion to Transfer and to Dismiss. Signed by Judge David Folsom on 4/12/04. (k: 04/13/2004)   |
| <input type="checkbox"/> | Online | 04/16/2004 | 33 | ORDER granting 30 Motion for Leave to File Excess Pages to file Sur-Reply in support c motion to dismiss. Signed by Judge David Folsom on 4/14/04. cc: attys (poa, ) (Entere   |
| <input type="checkbox"/> | Online | 04/16/2004 | 34 | SUR-REPLY to Response to Motion re 19 MOTION to Dismiss filed by TIVO Inc. (ktd, ) ( 04/19/2004)   |
| <input type="checkbox"/> | Online | 07/20/2004 | 35 | MOTION for Hearing /Scheduling Conference, or in the alternative, Request for Order F to Hold Rule 26(f) Conference by TIVO Inc. (Attachments: # 1 Text of Proposed Order. Garret) (Entered: 07/20/2004)   |

|                          |        |            |    |   |
|--------------------------|--------|------------|----|---|
| <input type="checkbox"/> | Online | 07/22/2004 | 36 | RESPONSE in Opposition re 35 MOTION for Hearing /Scheduling Conference, or in the Request for Order Requiring Parties to Hold Rule 26(f) Conference filed by EchoStar Te Corporation, Echosphere Limited Liability Company. (Friedman, Paul) (Entered: 07/22/2004)  |
| <input type="checkbox"/> | Online | 08/27/2004 | 37 | ORDER to Conduct Rule 26(f) Conference. Signed by Judge David Folsom on 8/26/04. (Entered: 08/27/2004)  |
| <input type="checkbox"/> | Online | 10/15/2004 | 38 | NOTICE of Disclosure by TIVO Inc (Baxter, Samuel) (Entered: 10/15/2004)   |
| <input type="checkbox"/> | Online | 10/20/2004 | 39 | NOTICE of Disclosure by EchoStar Technologies Corporation, Echosphere Limited Liabil Echostar Communications Corporation, Echostar DBS Corporation (Young, Damon) (En 10/20/2004)   |
| <input type="checkbox"/> | Online | 10/25/2004 | 40 | NOTICE by EchoStar Technologies Corporation, Echosphere Limited Liability Company, Communications Corporation, TIVO Inc of Joint Rule 26(f) Conference Report (Attachrr 1Proposed Scheduling Order (Submitted by Defendant)# 2Proposed Scheduling Order Plaintiff Tivo))(Chambers, Garret) Modified on 10/26/2004 (fal). (Entered: 10/25/2004)              |
| <input type="checkbox"/> | Runner | 10/28/2004 | -- | Notified Attorney, Zachariah A. Higgins, Per GO 04-12, that we received several email leaving 2 voice mail messages on his phone and his assistant phone on 10/20/04 and have no response from either as of 10/25/04. He is no longer with Morrison & Foerster 10/28/2004)  |
| <input type="checkbox"/> | Online | 11/03/2004 | 41 | MOTION for Zachariah A Higgins to Withdraw as Attorney by "EchoStar defendants". (f 11/04/2004)   |
| <input type="checkbox"/> | Online | 11/12/2004 | 42 | ORDER Setting Hearing on Motion 19 MOTION to Change Venue MOTION to Dismiss: M for 12/8/2004 11:00 AM in Ctrm 319 (Texarkana) before Judge David Folsom.. Signed Folsom on 11/11/04. (mrm, ) (Entered: 11/12/2004)  |
| <input type="checkbox"/> | Online | 11/12/2004 | 43 | ORDER granting 41 Motion to Withdraw as Attorney. Attorney Zachariah A. Higgins ter by Judge David Folsom on 11/10/04. (mrm, ) (Entered: 11/12/2004)  |
| <input type="checkbox"/> | Online | 11/15/2004 | 44 | ORDER The Court has set a Rule 16(b) Scheduling and Planning Conference for 12/8/2 following the court's hearing on Dfts Motion to Dismiss and Transfer in Ctrm 319 (Texa Judge David Folsom.. Signed by Judge David Folsom on 11/15/04. (mrm, ) Modified or (mrm, ). (Entered: 11/15/2004)   |
| <input type="checkbox"/> | Online | 12/08/2004 | 45 | Minute Entry for proceedings held before Judge David Folsom : Motion Hearing held on MOTION to Change Venue MOTION to Dismiss filed by Echostar Communications Corp DBS Corporation, EchoStar Technologies Corporation, Echosphere Limited Liability Con Conference held on 12/8/2004. (Court Reporter Libby Crawford.) (mrm, ) (Entered: 12/08/2004)       |
| <input type="checkbox"/> | Online | 12/13/2004 | 46 | Joint MOTION for Protective Order by "EchoStar defendants", EchoStar Technologies C Echosphere Limited Liability Company, Echostar Communications Corporation, Echosta Corporation, TIVO Inc. (Attachments: # 1 Exhibit A# 2 Text of Proposed Order)(Baxter (Entered: 12/13/2004)   |
| <input type="checkbox"/> | Online | 12/22/2004 | 47 | Proposed Pretrial Order [propoe] scheduling order by "EchoStar defendants". (Friedm Additional attachment(s) added on 12/22/2004 (rml, ). (Entered: 12/22/2004)   |
| <input type="checkbox"/> | Runner | 01/04/2005 | 48 | TRANSCRIPT of Proceedings (on motion to dismiss) held on 12/8/2004 before Judge D: Court Reporter: Libby Crawford. (sm, ) (Entered: 01/04/2005)   |
| <input type="checkbox"/> | Online | 02/07/2005 | 49 | STIPULATED PROTECTIVE ORDER granting 46 Motion for Protective Order . Signed by : Folsom on 2/7/05. (mrm, ) (Entered: 02/07/2005)   |
| <input type="checkbox"/> | Online | 02/09/2005 | 50 | APPLICATION to Appear Pro Hac Vice by Attorney Andrei Iancu for TIVO Inc. (rml, ) (E 02/10/2005)  |
| <input type="checkbox"/> | Online | 02/09/2005 | 51 | APPLICATION to Appear Pro Hac Vice by Attorney Alexander C D Giza for TIVO Inc. (rn 02/10/2005)   |
| <input type="checkbox"/> | Runner | 02/10/2005 | -- | Pro Hac Vice Filing fee paid by Andrei Iancu; Fee: \$25, receipt number: 103810 (rml, ) 02/10/2005)   |
| <input type="checkbox"/> | Runner | 02/10/2005 | -- | Pro Hac Vice Filing fee paid by Alexander Giza; Fee: \$25, receipt number: 103811 (rml 02/10/2005)  |
| <input type="checkbox"/> | Online | 03/02/2005 | 52 | ***FILED IN ERROR PLEASE IGNORE*** MOTION to Compel Interrogatory Response F Technologies Corporation, Echosphere Limited Liability Company. (Friedman, Paul) Mo 3/2/2005 (mpv, ). Modified on 3/2/2005 (mpv, ). (Entered: 03/02/2005)  |
| <input type="checkbox"/> | Online | 03/02/2005 | 53 | ***FILED IN ERROR; PLEASE IGNORE*** AFFIDAVIT in Support re 52 MOTION to Corr Response Filed filed by EchoStar Technologies Corporation, Echosphere Limited Liabilit (Attachments: # 1 Exhibit A# 2 Exhibit B# 3 Exhibit C# 4 Exhibit D# 5 Exhibit E# 6 E: G# 8 Exhibit H# 9 Exhibit I# 10 Exhibit J)(Friedman, Paul) Modified on 3/2/2005 (mpv 03/02/2005) |
| <input type="checkbox"/> | Online | 03/02/2005 | 54 | ***FILED IN ERROR; PLEASE IGNORE*** Additional Attachments to Main Document: ! Compel Interrogatory Response Filed.. (Friedman, Paul) Modified on 3/2/2005 (mpv, ). 03/02/2005)   |
|                          |        |            |    | MOTION to Compel Interrogatory Response REPLACES DOCUMENT #'s 52, 53 & 54 by Technologies Corporation, Echosphere Limited Liability Company. (Attachments: # 1 A  |

|                          |        |            |    |   |
|--------------------------|--------|------------|----|---|
| <input type="checkbox"/> | Online | 03/02/2005 | 55 | Friedman in Support of Motion to Compel# 2 Exhibit A to the Declaration of Paul A. Friedman# 4 Exhibit C to the Declaration of Paul A. Friedman# 6 Exhibit E to the Declaration of Paul A. Friedman# 8 Exhibit G to the Declaration of Paul A. Friedman# 10 Exhibit I to the Declaration of Paul A. Friedman# 12 Text of Proposed Order Granting T (Friedman, Paul) Modified on 3/2/2005 (mpv, ). (Entered: 03/02/2005)   |
| <input type="checkbox"/> | Runner | 03/02/2005 | -- | ***FILED IN ERROR. Document # 52, 53, 54, Motion to Compel, Affidavit and Addition PLEASE IGNORE. SEE #55 for correct document *** (mpv, ) (Entered: 03/02/2005)  |
| <input type="checkbox"/> | Online | 03/03/2005 | 56 | SCHEDULING ORDER: Initial Pretrial Conference set for 9/1/2005 10:00 AM in Ctrm 31 before Judge David Folsom. Amended Pleadings due by 2/1/2005. Discovery due by 6/ of Parties due by 2/1/2005. Jury instructions due by 9/20/2005 Jury Selection set for 1 AM in Ctrm 106 (Marshall) before Judge David Folsom. Mediation Completion due by 8, Motions due by 6/30/2005. Proposed Pretrial Order due by 8/18/2005. Claim Construct 5/6/05 at 9:00 AM. Signed by Judge David Folsom on 3/3/05. (mpv, ) (Entered: 03/03/2005)   |
| <input type="checkbox"/> | Online | 03/09/2005 | 57 | ORDER ON DEFENDANT'S MOTION TO DISMISS AND TRANSFER; denying 19 Motion to denying 19 Motion to Dismiss; Therefore, the court ORDERS that Dfts Motion to Dismiss ECC and DENIED WITHOUT PREJUDICE as to EDBS. The court further ORDERS that Dft Transfer is DENIED . Signed by Judge David Folsom on 3/9/05. (mrm, ) (Entered: 03/09/2005)   |
| <input type="checkbox"/> | Online | 03/11/2005 | 58 | MOTION for Extension of Time to File Response/Reply Unopposed Motion for Extension Respond to Echostar's Motion to Compel Interrogatory Response by TIVO Inc. (Attachments: # 1 Proposed Order)(Baxter, Samuel) (Entered: 03/11/2005)   |
| <input type="checkbox"/> | Online | 03/16/2005 | 59 | ***FILED IN ERROR. PLEASE IGNORE. NO CERTIFICATE OF SERVICE. SEE DOC #63.* Opposition re 55 MOTION to Compel Interrogatory Response filed by TIVO Inc. (Attachment Declaration of Richard E. Lyon in Support of Opposition# 2 Ex. 1 to Lyon Decl.# 3 Ex. 4 Ex. 3 to Lyon Decl.# 5 Ex. 4 to Lyon Decl.# 6 Ex. 5 to Lyon Decl.# 7 Ex. 6 to Lyon Decl.# 8 Ex. 7 to Lyon Decl.# 9 Ex. 8 to Lyon Decl.# 10 Ex. 9 to Lyon Decl.# 11 Ex. 10 to Lyon Decl.# 12 Ex. 11 to Lyon Decl.# 13 Ex. 12 to Lyon Decl.# 14 Ex. 13 to Lyon Decl.# 15 Ex. 14 to Lyon Decl.# 16 Ex. 15 to Lyon Decl.# 17 Ex. 16 to Lyon Decl.# 18 Ex. 17 to Lyon Decl.# 19 Ex. 18 to Lyon Decl.# 20 Ex. 19 to Lyon Decl.# 21 Ex. 20 to Lyon Decl.# 22 Proposed Order Denying Motion to Compel)(Lyon, Richard) Modified on 3/17/2005 (fal, ). (Entered: 03/16/2005)                                       |
| <input type="checkbox"/> | Online | 03/16/2005 | 60 | ORDER GRANTING TIVO'S UNOPPOSED MOTION FOR EXTENSION OF TIME; granting 5 Extension of Time to File Response/Reply re 55 MOTION to Compel Interrogatory Response due by 3/16/2005. Signed by Judge David Folsom on 3/16/05. (mrm, ) (Entered: 03/16/2005)  |
| <input type="checkbox"/> | Online | 03/16/2005 | 61 | ***FILED IN ERROR. PLEASE IGNORE. NO CERTIFICATE OF SERVICE. SEE DOC #62.* Amend/Correct 56 Scheduling Order,, by TIVO Inc. (Attachments: # 1 Affidavit Declaration of Richard E. Lyon in support of Motion to Amend# 2 Exhibit 1# 3 Exhibit 2# 4 Exhibit 3# 5 Exhibit 4# 6 Exhibit 5# 7 Exhibit 6# 8 Exhibit 7# 9 Exhibit 8# 10 Exhibit 9# 11 Exhibit 10# 12 Exhibit 11# 13 Exhibit 12# 14 Exhibit 13# 15 Exhibit 14# 16 Exhibit 15# 17 Exhibit 16# 18 Exhibit 17# 19 Text of Proposed Order)(Giza, Alexander) Modified on 3/17/2005 (fal, ). (Entered: 03/16/2005)  |
| <input type="checkbox"/> | Online | 03/17/2005 | 62 | ***REPLACES DOC #61.*** MOTION to Amend/Correct 56 Scheduling Order,, by TIVO Inc. (Attachments: # 1 Declaration of Richard Lyon in support of Motion to Amend# 2 Exhibit 1# 3 Text of Proposed Order)(Giza, Alexander) Modified on 3/17/2005 (fal, ). (Entered: 03/17/2005)  |
| <input type="checkbox"/> | Online | 03/17/2005 | 63 | ***REPLACES DOC #59.*** RESPONSE in Opposition re 55 MOTION to Compel Interrogatory Response filed by TIVO Inc. (Attachments: # 1 Declaration of Richard E. Lyon in Support of Opposition re 55 MOTION to Compel Interrogatory Response# 2 Ex. 1 to Lyon Decl.# 3 Ex. 2 to Lyon Decl.# 4 Ex. 3 to Lyon Decl.# 5 Ex. 4 to Lyon Decl.# 6 Ex. 5 to Lyon Decl.# 7 Ex. 6 to Lyon Decl.# 8 Ex. 7 to Lyon Decl.# 9 Ex. 8 to Lyon Decl.# 10 Ex. 9 to Lyon Decl.# 11 Ex. 10 to Lyon Decl.# 12 Ex. 11 to Lyon Decl.# 13 Ex. 12 to Lyon Decl.# 14 Ex. 13 to Lyon Decl.# 15 Ex. 14 to Lyon Decl.# 16 Ex. 15 to Lyon Decl.# 17 Ex. 16 to Lyon Decl.# 18 Ex. 17 to Lyon Decl.# 19 Ex. 18 to Lyon Decl.# 20 Ex. 19 to Lyon Decl.# 21 Ex. 20 to Lyon Decl.# 22 Text of Proposed Order Denying Motion to Compel)(Lyon, Richard) Modified on 3/17/2005 (fal, ). (Entered: 03/17/2005) |
| <input type="checkbox"/> | Online | 03/17/2005 | 64 | MOTION to Compel EchoStar's Production of Documents, Interrogatory Responses, and Deposition by TIVO Inc. (Attachments: # 1 Proposed Order# 2 Declaration of Richard E. Lyon in Support of Motion to Compel# 3 Exhibit 1# 4 Exhibit 2# 5 Exhibit 3# 6 Exhibit 4# 7 Exhibit 5# 8 Exhibit 6# 9 Exhibit 7# 10 Exhibit 8# 11 Exhibit 9# 12 Exhibit 10# 13 Exhibit 11# 14 Exhibit 12# 15 Exhibit 13# 16 Exhibit 14# 17 Exhibit 15# 18 Exhibit 16# 19 Exhibit 17# 20 Exhibit 18# 21 Exhibit 19# 22 Exhibit 20# 23 Exhibit 21# 24 Exhibit 22# 25 Exhibit 23)(Lyon, Richard) (Entered: 03/17/2005)  |
| <input type="checkbox"/> | Online | 03/21/2005 | 65 | ANSWER to Amended Complaint for Patent Infringement, COUNTERCLAIM for Declaratory Judgment, Non-Infringement and Unenforceability (counterclaim filed by Defendant EchoStar Communications Corporation only) against TIVO Inc by EchoStar Communications Corporation.(Friedman, Paul) (Entered: 03/21/2005)   |
| <input type="checkbox"/> | Online | 03/21/2005 | 66 | RESPONSE in Opposition re 62 MOTION to Amend/Correct 56 Scheduling Order,, filed by TIVO Inc. (Attachments: # 1 Affidavit of Ann Citrin# 2 Affidavit of Paul A. Friedman# 3 Declaration of Paul A. Friedman# 4 Exhibit 2 to Friedman Decl.# 5 Exhibit 3 to Friedman Decl.# 6 Exhibit 4 to Friedman Decl.# 7 Exhibit 5 to Friedman Decl.)(Friedman, Paul) (Entered: 03/21/2005)  |

|                          |        |            |    |  |
|--------------------------|--------|------------|----|--|
| <input type="checkbox"/> | Online | 03/23/2005 | 67 | REPLY to Response to Motion re 55 MOTION to Compel Interrogatory Response filed by Technologies Corporation, Echosphere Limited Liability Company. (Friedman, Paul) (Entered: 03/23/2005)  |
| <input type="checkbox"/> | Online | 03/24/2005 | 68 | REPLY to Response to Motion re 62 MOTION to Amend/Correct 56 Scheduling Order,, f (Baxter, Samuel) (Entered: 03/24/2005)   |
| <input type="checkbox"/> | Online | 03/28/2005 | 69 | Joint MOTION to Amend/Correct 56 Scheduling Order,, by TIVO Inc. (Attachments: # : Proposed Order)(Giza, Alexander) (Entered: 03/28/2005)  |
| <input type="checkbox"/> | Online | 03/29/2005 | 70 | RESPONSE in Opposition re 64 MOTION to Compel EchoStar's Production of Document: Responses, and Attendance at Deposition filed by "EchoStar defendants". (Attachment: Citrin Decl# 2 Affidavit Friedman Decl# 3 Exhibit A to Friedman Decl# 4 Exhibit B to Friedman Decl# 5 Exhibit C to Friedman Decl# 6 Exhibit D to Friedman Decl# 7 Exhibit E to Friedman Decl# 8 Exhibit F to Friedman Decl# 9 Exhibit G to Friedman Decl# 10 Exhibit H to Friedman Decl# 11 Exhibit I to Friedman Decl# 12 Exhibit J to Friedman Decl# 13 Exhibit K to Friedman Decl# 14 Exhibit L to Friedman Decl# 15 Exhibit M to Friedman Decl# 16 Exhibit N to Friedman Decl# 17 Exhibit O to Friedman Decl# 18 Exhibit P to Friedman Decl)(Friedman, Paul) (Entered: 03/29/2005) |
| <input type="checkbox"/> | Online | 03/30/2005 | 71 | APPLICATION to Appear Pro Hac Vice by Attorney Jason A Crotty for Echostar Commur Corporation; Echostar DBS Corporation; EchoStar Technologies Corporation; Echosphe Liability Company. (rml, ) (Entered: 03/30/2005)  |
| <input type="checkbox"/> | Runner | 03/30/2005 | -- | Pro Hac Vice Filing fee paid by Jason Crotty; Fee: \$25, receipt number: 5-1-60 (rml, ) (03/30/2005)   |
| <input type="checkbox"/> | Online | 03/30/2005 | 72 | APPLICATION to Appear Pro Hac Vice by Attorney Karl J Kramer for Echostar Communi Corporation; Echostar DBS Corporation; EchoStar Technologies Corporation; Echosphe Liability Company. (rml, ) (Entered: 03/30/2005)  |
| <input type="checkbox"/> | Runner | 03/30/2005 | -- | Pro Hac Vice Filing fee paid by Karl Kramer; Fee: \$25, receipt number: 5-1-061 (rml, ) (03/30/2005)   |
| <input type="checkbox"/> | Online | 03/30/2005 | 73 | AMENDMENT TO SCHEDULING ORDER: Claim Construction Brief due at 4:00 pm PST o Opposition Claim Construction Briefs due 5/9/05; Claim Construction hearing on 5/23/05; due by 6/24/2005.. Signed by Judge David Folsom on 3/30/05. (mrm, ) (Entered: 03/30/2005)   |
| <input type="checkbox"/> | Online | 03/30/2005 | 74 | RESPONSE in Opposition re 55 MOTION to Compel Interrogatory Response (Sur-Reply); Inc. (Attachments: # 1 Declaration of Richard E. Lyon in Support of Sur-Reply# 2 Ex. 3# 5 Ex. 4# 6 Ex. 5)(Lyon, Richard) (Entered: 03/30/2005)   |
| <input type="checkbox"/> | Online | 04/01/2005 | 75 | APPLICATION to Appear Pro Hac Vice by Attorney Robert M Harkins, Jr for Echostar Co Corporation; Echostar DBS Corporation; EchoStar Technologies Corporation; Echosphe Liability Company. (rml, ) (Entered: 04/01/2005)  |
| <input type="checkbox"/> | Runner | 04/01/2005 | -- | Pro Hac Vice Filing fee paid by Robert Harkins Jr; Fee: \$25, receipt number: 5-1-67 (rml, ) (04/01/2005)  |
| <input type="checkbox"/> | Online | 04/04/2005 | 76 | APPLICATION to Appear Pro Hac Vice by Attorney Ann Critin for "EchoStar defendants" Communications Corporation; Echostar DBS Corporation; EchoStar Technologies Corp Echosphere Limited Liability Company;(rml, ) (Entered: 04/04/2005)  |
| <input type="checkbox"/> | Runner | 04/04/2005 | -- | Pro Hac Vice Filing fee paid by Ann Critin; Fee: \$25, receipt number: 5-1-071 (rml, ) (04/04/2005)  |
| <input type="checkbox"/> | Online | 04/05/2005 | 77 | REPLY to Response to Motion re 64 MOTION to Compel EchoStar's Production of Docun Interrogatory Responses, and Attendance at Deposition filed by TIVO Inc. (Attachment Declaration of Richard E. Lyon in support of Reply Brief)(Lyon, Richard) (Entered: 04/05/2005)  |
| <input type="checkbox"/> | Online | 04/11/2005 | 78 | REPLY to EchoStar Communication Corporation's Counterclaim ANSWER to Counterclai (Lyon, Richard) (Entered: 04/11/2005)   |
| <input type="checkbox"/> | Online | 04/11/2005 | 79 | MOTION In Support of EchoStar's Opening Claim Construction Brief by "EchoStar defer (Attachments: # 1 Affidavit Harkins decl# 2 Exhibit a to Harkins# 3 Exhibit B to Harkir Harkins decl exhs C to M# 5 Affidavit Reader Decl and Exhs.# 6 Affidavit Rhyne Decl# Proposed Order Proposed Order)(Harkins, Robert) (Entered: 04/11/2005)   |
| <input type="checkbox"/> | Online | 04/11/2005 | 80 | MOTION for Hearing re TiVo's Opening Claim Construction Brief by TIVO Inc. (Attachm Affidavit Giza Declaration and Exs. 1-2# 2 Affidavit Exs. 3-9 (Giza Decl.)# 3 Text of Pr (Giza, Alexander) (Entered: 04/11/2005)   |
| <input type="checkbox"/> | Runner | 04/18/2005 | 81 | SEALED Second MOTION to Compel by "EchoStar defendants". (mpv, ) (Entered: 04/18/2005)   |
| <input type="checkbox"/> | Online | 04/19/2005 | 82 | ORDER REFERRING MOTION to the Honorable Harry W. McKee: [81] MOTION to Comp "EchoStar defendants", . Signed by Judge David Folsom on 4/19/05. (mrm, ) (Entered: 04/19/2005)  |
| <input type="checkbox"/> | Online | 04/26/2005 | 83 | MOTION for Leave to File First Amended Answers to First Amended Complaint and Cou Unopposed by Tivo, by Echostar Communications Corporation, Echostar DBS Corporati Technologies Corporation, Echosphere Limited Liability Company. (Attachments: # 1 E Exhibit B# 3 Text of Proposed Order)(Friedman, Paul) (Entered: 04/26/2005)   |
| <input type="checkbox"/> | Online | 04/27/2005 | 84 | RESPONSE in Opposition re [81] MOTION to Compel filed by TIVO Inc. (Attachments: ; in support of Opposition# 2 Lyon Decl. in support of Opposition# 3 Exhibits to Lyon De Proposed Order)(Lyon, Richard) (Entered: 04/27/2005)   |

|                          |        |            |     |  |
|--------------------------|--------|------------|-----|--|
| <input type="checkbox"/> | Online | 04/29/2005 | 85  | Third MOTION to Compel by "EchoStar defendants". (Attachments: # 1 Affidavit of Jas Exhibit to J. Crotty Decl.# 3 Text of Proposed Order)(Friedman, Paul) (Entered: 04/29/2005)  |
| <input type="checkbox"/> | Online | 05/04/2005 | 86  | REPLY to Response to Motion re [81] MOTION to Compel (Second Set) filed by "EchoStar defendants". (Attachments: # 1 Affidavit of Paul A. Friedman# 2 Exhibit 1-3# 3 Exhibit 4# 4 Exhibit 5) (Entered: 05/04/2005)  |
| <input type="checkbox"/> | Runner | 05/06/2005 | 87  | SEALED MOTION to Compel Deposition Testimony by Echostar Communications Corporation, DBS Corporation, EchoStar Technologies Corporation, Echosphere Limited Liability Company (Entered: 05/09/2005)  |
| <input type="checkbox"/> | Online | 05/06/2005 | 91  | Minute Entry for proceedings held before Judge H. W. McKee : Telephone Conference concerning Motion to Compel held on 5/6/2005. (Court Reporter M. Morris.) (mjm, ) (Entered: 05/10/2005)  |
| <input type="checkbox"/> | Online | 05/09/2005 | 88  | Fifth MOTION to Compel by "EchoStar defendants". (Attachments: # 1 Affidavit of Jas Exhibit A# 3 Exhibit B# 4 Exhibit C# 5 Text of Proposed Order)(Friedman, Paul) (Entered: 05/09/2005)   |
| <input type="checkbox"/> | Online | 05/09/2005 | 89  | Joint MOTION to Amend/Correct Scheduling Order by TIVO Inc. (Attachments: # 1 Text of Proposed Order Amending Scheduling Order)(Lyon, Richard) (Entered: 05/09/2005)   |
| <input type="checkbox"/> | Online | 05/10/2005 | 90  | NOTICE of Hearing:Motions Hearing set for 5/19/2005 02:00 PM before Magistrate Judge David Folsom. (mjm, ) (Entered: 05/10/2005)   |
| <input type="checkbox"/> | Online | 05/11/2005 | 92  | AMENDED SCHEDULING ORDER: 1. The parties will file their opposition claim construction by 5/12/05. 2. Disclosure of expert testimony shall be made by the party with burden of proof by 5/16/05. Thereafter, the other party shall have until 6/6/05, to disclose rebuttal expert testimony. 3. Discovery due by 6/27/2005. 4. Motions to transfer, motions to dismiss, motions to set aside or other dispositive motions and Daubert motions due by 7/5/2005. 5. All other dates: unchanged. Signed by Judge David Folsom on 5/11/05. (mrm, ) (Entered: 05/11/2005)   |
| <input type="checkbox"/> | Online | 05/11/2005 | 93  | RESPONSE in Opposition re 85 Third MOTION to Compel filed by TIVO Inc. (Attachments: # 1 Declaration in support of Opposition# 2 Exhibits 1-2 to Lyon Declaration# 3 Exhibits 3-4 to Denny Declaration in support of Opposition# 5 Text of Proposed Order to Compel)(Lyon, Richard) (Entered: 05/11/2005)  |
| <input type="checkbox"/> | Online | 05/11/2005 | 94  | RESPONSE in Opposition re [81] MOTION to Compel (Sur-Reply) filed by TIVO Inc. (Attachments: # 1 Lyon Declaration in support of Sur-Reply# 2 Exhibits to Lyon Declaration# 3 Denny Declaration in support of Sur-Reply)(Lyon, Richard) (Entered: 05/11/2005)   |
| <input type="checkbox"/> | Online | 05/12/2005 | 95  | ORDER GRANTING AGREED MOTION TO ALLOW ECHOSTAR LEAVE TO FILE FIRST AMENDED COMPLAINT AND COUNTERCLAIMS; granting 83 Motion for Leave to Amend Answers to First Amended Complaint and Counterclaims. Signed by Judge David Folsom on 5/12/05. (mrm, ) (Entered: 05/12/2005)   |
| <input type="checkbox"/> | Online | 05/12/2005 | 96  | ***FILED IN ERROR. SEE CORRECTED DOCUMENT #97*** MOTION for Hearing Opposition to Construction Brief by TIVO Inc. (Attachments: # 1 Affidavit Declaration of Dr. Gibson# 2 Declaration of Giza and Ex. 1# 3 Exhibit Giza Decl. Exs. 2-4# 4 Exhibit Giza Decl. Exs. 5-6)(Giza, Alexander) Modified on 5/13/2005 (ehs, ). (Entered: 05/12/2005)  |
| <input type="checkbox"/> | Online | 05/12/2005 | 97  | ***REPLACES DOCUMENT #96 WHICH WAS FILED IN ERROR*** RESPONSE in Opposition to Motion In Support of EchoStar's Opening Claim Construction Brief filed by TIVO Inc. (Attachments: # 1 Affidavit Declaration of Dr. Gibson# 2 Affidavit Giza Decl. and Ex. 1# 3 Exhibit Giza Decl. Exs 5-6)(Giza, Alexander) Modified on 5/13/2005 (ehs, ). (Entered: 05/12/2005)  |
| <input type="checkbox"/> | Runner | 05/12/2005 | 98  | SEALED RESPONSE to 80 TIVO's Opening Brief on Claim Construction with attached Affidavit Declaration by "EchoStar defendants". (mpv, ) (Entered: 05/13/2005)   |
| <input type="checkbox"/> | Online | 05/16/2005 | 99  | MOTION to Continue the May 23, 2005 Claim Construction Hearing by "EchoStar defendants". (Attachments: # 1 Exhibit A# 2 Text of Proposed Order)(Friedman, Paul) (Entered: 05/16/2005)  |
| <input type="checkbox"/> | Online | 05/16/2005 | 100 | Joint MOTION to Amend/Correct 92 Scheduling Order,, Case Scheduling Conference; Expedited Treatment of EchoStar's Motion to Continue The Claim Construction Hearing by TIVO Inc., Echostar Communications Corporation, Echostar DBS Corporation, Echostar Communications Corporation, Echostar DBS Corporation, EchoStar Technologies Corporation, Echosphere Limited Liability Company. (Attachments: # 1 Text of Proposed Order)(Friedman, Paul) (Entered: 05/16/2005)   |
| <input type="checkbox"/> | Online | 05/16/2005 | 101 | REPLY to Response to Motion re 85 Third MOTION to Compel filed by "EchoStar defendants". (Attachments: # 1 Exhibit A# 2 Text of Proposed Order)(Friedman, Paul) (Entered: 05/16/2005)  |
| <input type="checkbox"/> | Online | 05/17/2005 | 102 | ORDER REFERRING MOTION to the Honorable Harry W. McKee: 85 Third MOTION to Compel Interrogatory Response filed by "EchoStar defendants",, 55 MOTION to Compel Interrogatory Response filed by EchoStar Technologies Corporation,, Echosphere Limited Liability Company,, [87] MOTION to Compel filed by TIVO Inc., Echostar Communications Corporation,, Echostar DBS Corporation,, EchoStar Technologies Corporation,, Echosphere Limited Liability Company,, 88 Fifth MOTION to Compel filed by "EchoStar defendants",, MOTION to Compel EchoStar's Production of Documents, Interrogatory Responses, and Deposition filed by TIVO Inc. . Signed by Judge David Folsom on 5/16/05. (mrm, ) (Entered: 05/17/2005) |
| <input type="checkbox"/> | Online | 05/18/2005 | 103 | RESPONSE in Opposition re 100 Joint MOTION to Amend/Correct 92 Scheduling Order, Case Scheduling Conference; Expedited Treatment of EchoStar's Motion to Continue The Claim Construction Hearing by TIVO Inc. (Attachments: # 1 Exhibit Exhibits A, B and C)(Lyon, Richard) (Entered: 05/18/2005)  |



|                          |        |            |     |   |
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|                          |        |            |     | (Lyon, Richard) (Entered: 06/20/2005)   |
| <input type="checkbox"/> | Online | 06/23/2005 | 127 | REPLY to Response to Motion re 118 Sixth MOTION to Compel filed by "EchoStar defen (Friedman, Paul) (Entered: 06/23/2005)   |
| <input type="checkbox"/> | Online | 06/27/2005 | 128 | RESPONSE in Opposition re 118 Sixth MOTION to Compel Sur-Reply filed by TIVO Inc. (Entered: 06/27/2005)   |
| <input type="checkbox"/> | Online | 06/28/2005 | 129 | APPLICATION to Appear Pro Hac Vice by Attorney Michelle Armond for TIVO Inc. (ch, ) (07/07/2005)  |
| <input type="checkbox"/> | Runner | 07/01/2005 | --  | Pro Hac Vice Filing fee paid by Armond; Fee: \$25, receipt number: 2-1-427 (ch, ) (Ent 07/07/2005)  |
| <input type="checkbox"/> | Online | 07/08/2005 | 130 | ***FILED IN ERROR. PLEASE IGNORE. SEE DOC #131.*** MOTION to Compel Enforce Resolution and for a Court Order Concerning Motions To Compel by "EchoStar defendai (Attachments: # 1 Text of Proposed Order [Proposed] Stipulated Order Regarding the Compromises on Pending Motions to Compel)(Kramer, Karl) Modified on 7/11/2005 (fa 07/08/2005)  |
| <input type="checkbox"/> | Online | 07/08/2005 | 131 | ***REPLACES DOC #130.*** MOTION to Compel to Enforce May 24, 2005 Resolution Order Concerning Motions to Compel by "EchoStar defendants". (Attachments: # 1 Te; Order [Proposed] Stipulated Order Regarding The Parties' Compromises on Pending Mc 2 Affidavit Declaration of Karl J. Kramer in Support of Echostar's Motion to Enforce May Resolution and for a Court Order Concerning Motions to Compel# 3 Exhibit A# 4 Exhib C# 6 Exhibit D# 7 Exhibit E# 8 Exhibit F# 9 Exhibit G)(Kramer, Karl) Modified on 7/11 (Entered: 07/08/2005) |
| <input type="checkbox"/> | Online | 07/08/2005 | 132 | Seventh MOTION to Compel by "EchoStar defendants". (Attachments: # 1 Affidavit of in Support of Motion# 2 Exhibit A# 3 Exhibit B# 4 Exhibit C# 5 Exhibit D# 6 Exhibit E# 7 Exhibit G1# 9 Exhibit G2# 10 Exhibit H# 11 Exhibit I# 12 Exhibit J# 13 Exhibit K# 14 Exhibit M# 16 Exhibit N# 17 Exhibit O# 18 Text of Proposed Order)(Friedman, Paul) (E 07/08/2005)  |
| <input type="checkbox"/> | Runner | 07/11/2005 | --  | ***FILED IN ERROR. PLEASE IGNORE Doc #130, Motion to Compel. Replaced with Doc (Entered: 07/11/2005)  |
| <input type="checkbox"/> | Online | 07/11/2005 | 134 | FILED UNDER SEAL - EXHIBIT C to #132 Seventh Motion to Compel by "EchoStar defe Communications Corporation, Echostar DBS Corporation, Echosphere Limited Liability ( (Entered: 07/14/2005)  |
| <input type="checkbox"/> | Online | 07/13/2005 | 133 | ORDER REFERRING MOTIONS TO THE HONORABLE HARRY W. MCKEE: 131 MOTION to Enforce May 24, 2005 Resolution and for a Court Order Concerning Motions to Compel "EchoStar defendants",,, 118 Sixth MOTION to Compel filed by "EchoStar defendants",, MOTION to Compel filed by "EchoStar defendants", . Signed by Judge David Folsom on (mrm, ) (Entered: 07/13/2005)   |
| <input type="checkbox"/> | Online | 07/15/2005 | 135 | Eighth MOTION to Compel by "EchoStar defendants". (Attachments: # 1 Text of Propo (Friedman, Paul) Additional attachment(s) added on 7/15/2005 (sm, ). (Entered: 07/1   |
| <input type="checkbox"/> | Online | 07/15/2005 | 136 | MOTION for Partial Summary Judgment of Non-Infringement: (1) No Infringement by I 7100/7200 Devices; and (2) No Infringement Under the Doctrine of Equivalents by "Ec defendants". (Attachments: # 1 Text of Proposed Order Proposed Order# 2 Exhibit Krz Sheet)(Kramer, Karl) (Entered: 07/15/2005)  |
| <input type="checkbox"/> | Online | 07/15/2005 | 137 | FILED UNDER SEAL EXHIBIT to doc # 136. (poa, ) (Entered: 07/19/2005)  |
| <input type="checkbox"/> | Online | 07/15/2005 | 141 | ***Document modified to attach correct document*** FILED UNDER SEAL - EXHIBIT I Eighth Motion to Compel #135 by EchoStar Technologies Corporation. (ehs) Modified o (ehs) (Entered: 07/21/2005)   |
| <input type="checkbox"/> | Online | 07/20/2005 | 138 | ORDER REFERRING MOTION to the Honorable Harry W. McKee: 135 Eighth MOTION to "EchoStar defendants", . Signed by Judge David Folsom on 7/20/05. (mrm, ) (Entered   |
| <input type="checkbox"/> | Online | 07/20/2005 | 139 | RESPONSE in Opposition re 131 MOTION to Compel to Enforce May 24, 2005 Resolutio Order Concerning Motions to Compel filed by TIVO Inc. (Attachments: # 1 Affidavit Ho and Exhibits A and B# 2 Affidavit Chambers Declaration# 3 Text of Proposed Order)(L (Entered: 07/20/2005)   |
| <input type="checkbox"/> | Online | 07/20/2005 | 140 | RESPONSE in Opposition re 132 Seventh MOTION to Compel filed by TIVO Inc. (Attach Affidavit Hoffman Declaration and Exhibits A to G)(Lyon, Richard) (Entered: 07/20/200   |
| <input type="checkbox"/> | Online | 07/22/2005 | 142 | NOTICE of Hearing: Discovery Hearing set for 7/29/2005 09:30 AM in Ctrm 210 (Tyler Magistrate Judge Harry W. McKee. (srg, ) (Entered: 07/22/2005)   |
| <input type="checkbox"/> | Online | 07/26/2005 | 143 | NOTICE by "EchoStar defendants" Letter Brief to Judge McKee Regarding Completion o Deposition (Kramer, Karl) (Entered: 07/26/2005)  |
| <input type="checkbox"/> | Online | 07/26/2005 | 144 | RESPONSE in Support re 131 MOTION to Compel to Enforce May 24, 2005 Resolution e Order Concerning Motions to Compel filed by "EchoStar defendants". (Kramer, Karl) (E 07/26/2005)   |
|                          |        |            |     | REPLY to Response to Motion re 132 Seventh MOTION to Compel filed by "EchoStar de (Attachments: # 1 Supplemental Declaration of Paul A. Friedman In Support of EchoSt   |

|                          |        |            |     |   |
|--------------------------|--------|------------|-----|---|
| <input type="checkbox"/> | Online | 07/26/2005 | 145 | Motion to Compel# 2 Exhibit 1, Part 1 to Friedman Decl.# 3 Exhibit 1, Part 2 to Friedman Exhibit 1, Part 3 to Friedman Decl.# 5 Exhibit 1, Part 4 to Friedman Decl.# 6 Exhibit 1, Friedman Decl.# 7 Exhibit 1, Part 6 to Friedman Decl.# 8 Exhibit 1, Part 7 to Friedman 1, Part 8 to Friedman Decl.)(Friedman, Paul) (Entered: 07/26/2005)   |
| <input type="checkbox"/> | Online | 07/27/2005 | 146 | NOTICE by "EchoStar defendants" Notice Removing EchoStar's Eighth Motion to Compel (Kramer, Karl) (Entered: 07/27/2005)   |
| <input type="checkbox"/> | Online | 07/27/2005 | 147 | ***FILED IN ERROR. SEE CORRECTED DOCUMENT #149*** RESPONSE in Opposition for Partial Summary Judgment of Non-Infringement: (1) No Infringement by EchoStar' Devices; and (2) No Infringement Under the Doctrine of Equivalents filed by TIVO Inc. 1 Affidavit Giza Decl iso Opposition w/ Exs. 1-11# 2 Text of Proposed Order)(Giza, Alexander) (Entered: 07/27/2005)   |
| <input type="checkbox"/> | Online | 07/27/2005 | 148 | RESPONSE in Opposition re 135 Eighth MOTION to Compel filed by TIVO Inc. (Lyon, Richard) (Entered: 07/27/2005)  |
| <input type="checkbox"/> | Online | 07/27/2005 | 149 | ***REPLACES DOCUMENT #147WHICH WAS FILED IN ERROR*** RESPONSE in Opposition for Partial Summary Judgment of Non-Infringement: (1) No Infringement by TIVO Inc. 7100/7200 Devices; and (2) No Infringement Under the Doctrine of Equivalents filed by TIVO Inc. (Attachments: # 1 Affidavit Giza Decl. iso Opposition w/ Exs. 1-11# 2 Text of Proposed Order) (Alexander) Modified on 8/9/2005 (ehs, ). (Entered: 07/27/2005)  |
| <input type="checkbox"/> | Online | 07/28/2005 | 150 | ***SEALED PER ORDER # 176*** Second MOTION to Compel by TIVO Inc. (Attachments: # 1 Affidavit Hoffman Declaration and Exhibits# 2) Text of Proposed Order (original sent to Marshall Ofc 9/13/05) Modified on 8/16/2005 (mrm, ). Modified on 8/16/2005 (mrm, ). Additional attachment(s) added on 9/13/2005 (mpv, ). Modified on 9/13/2005 (mpv, ) (Entered: 07/28/2005)  |
| <input type="checkbox"/> | Online | 07/28/2005 | 151 | REPLY to Response to Motion re 135 Eighth MOTION to Compel filed by "EchoStar defendants" (Friedman, Paul) (Entered: 07/28/2005)  |
| <input type="checkbox"/> | Online | 07/29/2005 | 152 | ORDER regarding motions heard before the court on 7/29/05 as set forth herein. Signed by Judge H. W. McKee on 7/29/05. (ehs) (Entered: 08/01/2005)  |
| <input type="checkbox"/> | Online | 07/29/2005 | 153 | Minute Entry for proceedings held before Judge H. W. McKee : Motion Hearing held on 7/29/05 re 135 Eighth MOTION to Compel to Enforce May 24, 2005 Resolution and for a Court Order Concerning the Proposed Order filed by "EchoStar defendants",, 135 Eighth MOTION to Compel filed by "EchoStar defendants",, 132 Seventh MOTION to Compel filed by "EchoStar defendants",, 132 Seventh MOTION to Compel filed by "EchoStar defendants"; An order will be entered regarding these motions. (Court Reporter: Jill E McFadden.) (mjm, ) (Entered: 08/01/2005) |
| <input type="checkbox"/> | Runner | 08/01/2005 | 156 | TRANSCRIPT of Motion hearing held on July 29, 2005 at 10:37 am before Judge Harry McKee. Reporter: Jill E McFadden. (ehs) (Entered: 08/03/2005)   |
| <input type="checkbox"/> | Online | 08/02/2005 | 154 | NOTICE by "EchoStar defendants" and [Defendants' Proposed] Order on Motions Argued at 8/2/05 Hearing (Attachments: # 1 Exhibit A)(Friedman, Paul) (Entered: 08/02/2005)   |
| <input type="checkbox"/> | Online | 08/02/2005 | 155 | NOTICE by TIVO Inc [Proposed] Order Re EchoStar's Motion to Enforce May 24, 2005 Resolution and for a Court Order Concerning the Proposed Order filed by "EchoStar defendants",, 135 Eighth MOTION to Compel filed by "EchoStar defendants",, 132 Seventh MOTION to Compel filed by "EchoStar defendants"; An order will be entered regarding these motions. (Court Reporter: Jill E McFadden.) (mjm, ) (Entered: 08/02/2005)   |
| <input type="checkbox"/> | Online | 08/03/2005 | 157 | REPLY to Response to Motion re 136 MOTION for Partial Summary Judgment of Non-Infringement by EchoStar's 7100/7200 Devices; and (2) No Infringement Under the Doctrine of Equivalents filed by "EchoStar defendants". (Friedman, Paul) (Entered: 08/03/2005)  |
| <input type="checkbox"/> | Online | 08/04/2005 | 158 | ORDER granting 131 Motion to Compel, granting in part and denying in part 132 Motion to Compel set forth herein. Signed by Judge T. John Ward on 8/4/05. (ehs, ) (Entered: 08/05/2005)  |
| <input type="checkbox"/> | Online | 08/05/2005 | 159 | MOTION to Continue the Deadline for Summary Judgment Motions On Issues of Infringement or Non-Infringement by "EchoStar defendants". (Friedman, Paul) Additional attachment(s) added on 8/5/05. (fal, ). (Entered: 08/05/2005)  |
| <input type="checkbox"/> | Online | 08/08/2005 | 160 | ORDER REFERRING MOTION to the Honorable Harry W. McKee for decision: 150 Second MOTION to Compel filed by TIVO Inc. , Signed by Judge David Folsom on 8/5/05. (mrm, ) (Entered: 08/08/2005)   |
| <input type="checkbox"/> | Runner | 08/08/2005 | --  | Notified Attorney, Ben Yorks, Per GO 04-12, this court no longer accepts pleadings in paper form. All notices and orders generated by the court shall be sent electronically. (ehs, ) (Entered: 08/08/2005)   |
| <input type="checkbox"/> | Online | 08/09/2005 | 161 | RESPONSE in Opposition re 159 MOTION to Continue the Deadline for Summary Judgment Motions On Issues of Infringement or Non-Infringement filed by TIVO Inc. (Attachments: # 1 Text of Proposed Order)(Giza, Alexander) (Entered: 08/09/2005)  |
| <input type="checkbox"/> | Online | 08/09/2005 | 162 | RESPONSE in Opposition re 150 Second MOTION to Compel filed by "EchoStar defendants" (Attachments: # 1 Affidavit of Paul A. Friedman and Exs. A-E# 2 Exhibit F-P# 3 Exhibit Q)(Friedman, Paul) (Entered: 08/09/2005)  |
| <input type="checkbox"/> | Online | 08/09/2005 | 163 | REPLY to Response to Motion re 159 MOTION to Continue the Deadline for Summary Judgment Motions On Issues of Infringement or Non-Infringement filed by "EchoStar defendants". (Friedman, Paul) (Entered: 08/09/2005)  |
| <input type="checkbox"/> | Online | 08/09/2005 | 164 | FILED UNDER SEAL - EXHIBIT 12 to Declaration of Alexander C.D. Giza in support of TIVO Inc.'s opposition to EchoStar's motion for partial summary judgment of non-infringement by TIVO Inc. (Giza, Alexander) (Entered: 08/10/2005)   |



|                          |        |            |     |   |
|--------------------------|--------|------------|-----|---|
| <input type="checkbox"/> | Online | 08/10/2005 | 165 | Third MOTION to Compel by TIVO Inc. (Attachments: # 1 Affidavit Declaration of Mich Exhibit A-J# 3 Text of Proposed Order)(Baxter, Samuel) (Entered: 08/10/2005)  |
| <input type="checkbox"/> | Online | 08/10/2005 | 166 | FILED UNDER SEAL - EXHIBITS B - C to declaration of Michelle Armond in support of p to compel #165 by TIVO Inc (ehs, ) (Entered: 08/10/2005)  |
| <input type="checkbox"/> | Online | 08/10/2005 | 167 | MOTION for Leave to File Excess Pages TIVO'S MOTION FOR LEAVE TO FILE TIVO'S SU OPPOSITION TO ECHOSTAR'S MOTION FOR PARTIAL SUMMARY JUDGMENT OF NON-IN (1) NO INFRINGEMENT BY ECHOSTAR'S 7100/7200 DEVICES; AND (2) NO INFRINGEM DOCTRINE OF EQUIVALENTS IN EXCESS OF PAGE LIMIT by TIVO Inc. (Attachments: # Proposed Order)(Baxter, Samuel) (Entered: 08/10/2005) |
| <input type="checkbox"/> | Online | 08/10/2005 | 170 | FILED UNDER SEAL - EXHIBIT A to Declaration of Paul A Friedman in Support of Deft's Tivo's second motion to compel by "EchoStar defendants"..(ehs, ) (Entered: 08/11/2005)  |
| <input type="checkbox"/> | Online | 08/11/2005 | 168 | RESPONSE in Opposition re 167 MOTION for Leave to File Excess Pages TIVO'S MOTIO FILE TIVO'S SURREPLY IN OPPOSITION TO ECHOSTAR'S MOTION FOR PARTIAL SUMM OF NON-INFRINGEMENT: (1) NO INFRINGEMENT BY ECHOSTAR'S 7100/7200 DEVICES "EchoStar defendants". (Friedman, Paul) (Entered: 08/11/2005)  |
| <input type="checkbox"/> | Online | 08/11/2005 | 169 | Consent MOTION to Seal TIVO'S SECOND MOTION TO COMPEL by TIVO Inc. (Attachm Proposed Order)(Baxter, Samuel) (Entered: 08/11/2005)   |
| <input type="checkbox"/> | Online | 08/11/2005 | 171 | FILED UNDER SEAL - EXHIBIT B to Declaration of Paul A Friedman in support of def't's Tivo's second motion to compel by "EchoStar defendants". (ehs, ) (Entered: 08/11/2005)   |
| <input type="checkbox"/> | Online | 08/11/2005 | 172 | FILED UNDER SEAL - EXHIBIT D to Declaration of Paul A Friedman in support of def't's Tivo's second motion to compel by "EchoStar defendants"..(ehs, ) (Entered: 08/11/2005)   |
| <input type="checkbox"/> | Online | 08/11/2005 | 173 | FILED UNDER SEAL - EXHIBIT P to Declaration of Paul A Friedman in Support of Deft's Tivo's second motion to compel by "EchoStar defendants". (ehs, ) (Entered: 08/11/2005)  |
| <input type="checkbox"/> | Online | 08/12/2005 | 174 | ORDER granting in part and denying in part 159 Motion to Continue the ddl for Summa Motions on Issues of Infringement or Non-Infringement is GRANTED-IN-PART and DEN that the ddl for summary judgment motions on issues of infringement or non-infring CONTINUED to 8/25/05. Signed by Judge David Folsom on 8/11/05. (mrm, ) (Entered: 08/12/2005)                |
| <input type="checkbox"/> | Online | 08/15/2005 | 175 | REPLY to Response to Motion re 150 Second MOTION to Compel filed by TIVO Inc. (Ba (Entered: 08/15/2005)   |
| <input type="checkbox"/> | Online | 08/15/2005 | 178 | Minute Entry for proceedings held before Judge H. W. McKee : Telephone Conference f 8/15/2005. (Court Reporter S. Guthrie.) (mjm, ) (Entered: 08/17/2005)   |
| <input type="checkbox"/> | Online | 08/16/2005 | 176 | ORDER granting 169 Motion to Seal . Signed by Judge David Folsom on 8/15/05. (mrr 08/16/2005)   |
| <input type="checkbox"/> | Online | 08/17/2005 | 177 | ORDER that EchoStar produce all such documents created before suit was filed, and m witnesses with knowledge of relevant pre-suit communications. EchoStar to make Mr. for five hours of deposition . Signed by Judge H. W. McKee on 8/17/05. (ehs, ) (Entere 08/17/2005)   |
| <input type="checkbox"/> | Online | 08/17/2005 | 179 | ORDER; ORDERED that each pty shall file a motion no later than 5:00pm Friday, 8/26/ estimate of the total time that pty needs to complete the presentation of testimony, in-examination, cross examination, re-direct, and rebuttal. . Signed by Judge David Folso (mrm, ) (Entered: 08/17/2005)  |
| <input type="checkbox"/> | Online | 08/17/2005 | 180 | ORDER; The Court hereby CONVERTS said initial pretrial conference to a status confer the same time and place. Status Conference set for 9/1/2005 10:00 AM in Ctrm 319 (1 Judge David Folsom.. Signed by Judge David Folsom on 8/17/05. (mrm, ) (Entered: 08/17/2005)  |
| <input type="checkbox"/> | Online | 08/17/2005 | 181 | FILED UNDER SEAL - MOTION for Leave to File second amended complaint to Join Ech by TIVO Inc. (ehs, ) (Entered: 08/18/2005)   |
| <input type="checkbox"/> | Online | 08/17/2005 | 182 | FILED UNDER SEAL - NOTICE of motion for and Memorandum in support of Echostar's Partial Summary Judgment re damages period by "EchoStar defendants". (ehs, ) (Ente 08/17/2005)  |
| <input type="checkbox"/> | Runner | 08/17/2005 | --  | ***FILED IN ERROR. ATTACHED WRONG DOCUMENT to Document # 181, Motion for I IGNORE.*** (ehs, ) (Entered: 08/18/2005)   |
| <input type="checkbox"/> | Online | 08/17/2005 | 186 | FILED UNDER SEAL - replaces document #181 - MOTION for Leave to File second ame join Echostar Satellite LLC by TIVO Inc. (ehs, ) (Entered: 08/18/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 183 | MOTION for Extension of Time to File and for Clarification of Pre-Trial Submissions by 1 (Attachments: # 1 Text of Proposed Order)(Armond, Michelle) (Entered: 08/18/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 184 | RESPONSE in Opposition re 183 MOTION for Extension of Time to File and for Clarificat Submissions filed by "EchoStar defendants". (McElhinny, Harold) (Entered: 08/18/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 185 | CLAIM CONSTRUCTION ORDER. Signed by Judge David Folsom on 8/18/05. (mrm, ) (E 08/18/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 187 | NOTICE by "EchoStar defendants" of Readiness to File Joint Pre-Trial Order (McElhinny (Entered: 08/18/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 188 | **WITHDRAWN AS PER ORDER # 333** MOTION in Limine No. 11 to Preclude Late Di by "EchoStar defendants". (Attachments: # 1 Text of Proposed Order Proposed Order# Evans Decl. ISO w/ Exhibits A-G# 3 Affidavit Evans Decl. Ex. H# 4 Affidavit Evans Dec I)(Kramer, Karl) Modified on 9/20/2005 (mrm, ). (Entered: 08/18/2005)   |

|                          |        |            |     |  |
|--------------------------|--------|------------|-----|--|
| <input type="checkbox"/> | Online | 08/18/2005 | 189 | MOTION for Partial Summary Judgment of Invalidity Due to Indefiniteness by "EchoStar Responses due by 8/30/2005 (Attachments: # 1 Exhibit A part 1# 2 Exhibit A part 2# Text of Proposed Order)(Harkins, Robert) (Entered: 08/18/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 190 | FILED UNDER SEAL - NOTICE of MOTION and Memorandum in support of motion for partial judgment of no willful infringement Volume 1 by "EchoStar defendants". (ehs, ) (Entered: 08/18/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 191 | FILED UNDER SEAL - Declaration of Karl J Kramer in Support of def't's motion for partial judgment of non-willfulness of infringement #190 Volume 1 of Exhibits A-C, Volume # defendants". (ehs, ) (Entered: 08/19/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 192 | FILED UNDER SEAL - Declaration of Karl J. Kramer in Support of def't's motion for partial judgment of non-willfulness of infringement #190 Volume II of Exhibits D-V, Volume # defendants". (ehs, ) (Entered: 08/19/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 193 | FILED UNDER SEAL - MOTION in Limine No. 1 - to preclude reference to, use of and re expert report and testimony of John R Hauser; Declaration of Karl J Kramer in support "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 194 | FILED UNDER SEAL - MOTION in Limine No. 2 - to exclude reference to or evidence re opinion of counsel; Declaration of Karl J Kramer in support thereof by "EchoStar defendants Modified on 8/19/2005 (ehs, ) ATTACHED CORRECT DOCUMENT TO ENTRY. (Entered: 08/19/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 195 | FILED UNDER SEAL - MOTION in Limine No. 3 - to preclude any reference to, use of or PTO Museum Display, or Alternatively, to allow discovery by "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 196 | FILED UNDER SEAL - MOTION in Limine No. 4 - to preclude TIVO from denying the existence of infringing alternatives; Declaration of Karl J Kramer in support thereof by "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 197 | FILED UNDER SEAL - MOTION in Limine No. 5 - to preclude reference to, use of, or reliance on expert report and opinion of Alan Gordon on Willfulness; Declaration of Karl J Kramer in support thereof by "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 198 | FILED UNDER SEAL - MOTION in Limine No. 6 - to preclude reference to, use of, and reliance on preamble of any asserted claim as a limitation; Declaration of Karl J Kramer in support thereof by "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 199 | FILED UNDER SEAL - MOTION in Limine No. 7 - to preclude reference to, use of, or reliance on conveyed sales of TIVO's subscription services; Declaration of Karl J. Kramer in Support thereof by "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 200 | FILED UNDER SEAL - MOTION in Limine No. 8 - to preclude reference to, use of, or reliance on expert report and testimony of Keith R Ugone on damages; Declaration of Karl J. Kramer in support thereof by "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)   |
| <input type="checkbox"/> | Online | 08/18/2005 | 201 | FILED UNDER SEAL - MOTION in Limine No. 9 - to preclude evidence on doctrine or equitable estoppel; Declaration of Karl J Kramer in support thereof by "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)  |
| <input type="checkbox"/> | Online | 08/18/2005 | 202 | FILED UNDER SEAL - MOTION in Limine No. 10 - to preclude reference to, use of, and reliance on other EchoStar Litigation; Declaration of Karl J. Kramer in support thereof by "EchoStar defendants". (ehs, ) (Entered: 08/19/2005)   |
| <input type="checkbox"/> | Online | 08/22/2005 | 203 | First MOTION to Amend/Correct 167 MOTION for Leave to File Excess Pages TIVO'S MOTION TO FILE TIVO'S SURREPLY IN OPPOSITION TO ECHOSTAR'S MOTION FOR PARTIAL SUMMARY JUDGMENT OF NON-INFRINGEMENT: (1) NO INFRINGEMENT BY ECHOSTAR'S 7100/7200 DEVICES; AND (Unopposed) by TIVO Inc. (Attachments: # 1)(Baxter, Samuel) (Entered: 08/22/2005)  |
| <input type="checkbox"/> | Online | 08/22/2005 | 204 | NOTICE by TIVO Inc re 165 Third MOTION to Compel Withdrawing Third Motion to Compel EchoStar's Agreement to Provide the Requested Discovery (Armond, Michelle) (Entered: 08/22/2005)   |
| <input type="checkbox"/> | Online | 08/23/2005 | 205 | ***FILED IN ERROR; PLEASE IGNORE; REPLACED BY #208 CORRECTED DOCUMENT** in Limine to Preclude any reference to, use of, and reliance upon PTO museum display, to allow discovery by "EchoStar defendants". (Kramer, Karl) Modified on 8/24/2005 (rmm, ) (Entered: 08/23/2005)  |
| <input type="checkbox"/> | Online | 08/23/2005 | 206 | ORDER granting 203 First MOTION to Amend/Correct 167 MOTION for Leave to File Excess Pages TIVO'S MOTION FOR LEAVE TO FILE TIVO'S SURREPLY IN OPPOSITION TO ECHOSTAR'S MOTION FOR PARTIAL SUMMARY JUDGMENT OF NON-INFRINGEMENT: (1) NO INFRINGEMENT BY ECHOSTAR'S 7100/7200 DEVICES; AND (Unopposed) by TIVO Inc.. Signed by Judge David Folsom on 8/23/2005. (mrm, ) (Entered: 08/23/2005)  |
| <input type="checkbox"/> | Runner | 08/23/2005 | --  | ***FILED IN ERROR. Document # 205, Third Motion in Limine. PLEASE IGNORE. REPLACED BY #208 CORRECTED DOCKET ENTRY*** (mpv, ) (Entered: 08/24/2005)   |
| <input type="checkbox"/> | Online | 08/24/2005 | 207 | ORDER re 183 MOTION for Extension of Time to File and for Clarification of Pre-Trial Status by TIVO Inc, Final Pretrial Conference set for 10/11/2005 in Ctrm 106 (Marshall) before Judge David Folsom. Jury Selection set for 10/12/2005 10:00 AM in Ctrm 106 (Marshall) before Judge David Folsom. Proposed Pretrial Order due by 8/26/2005 at 5pm. Objections to exhibits shall be filed by 9/9/05 at 5pm. Signed by Judge David Folsom on 8/24/05. (mrm, ) (Entered: 08/24/2005) |
|                          |        |            |     | AFFIDAVIT in Support re 195 MOTION in Limine No. 3--To Preclude Any Reference to,  |

|                          |                        |            |     |   |
|--------------------------|------------------------|------------|-----|---|
| <input type="checkbox"/> | <a href="#">Online</a> | 08/24/2005 | 208 | Reliance Upon PTO Museum Display (by Declarant Jonathan Bockman) filed by "EchoStar (Kramer, Karl) (Entered: 08/24/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/24/2005 | 209 | FILED UNDER SEAL - Surreply in Opposition re 136 MOTION for Partial Summary Judgment of Infringement: (1) No Infringement by EchoStar's 7100/7200 Devices; and (2) No Infringement under the Doctrine of Equivalents filed by TIVO Inc. (ehs, ) (Entered: 08/25/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/25/2005 | 210 | ORDER denying as moot 55 Motion to Compel, finding as moot 64 Motion to Compel . . . H. W. McKee on 8/25/05. (ehs, ) (Entered: 08/25/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/25/2005 | 211 | NOTICE by "EchoStar defendants" Letter Brief to Judge McKee Regarding Completion of Deposition (Kramer, Karl) Modified on 8/30/2005 (fal, ). Modified on 9/22/2005 (mpv, ) (Entered: 08/25/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/25/2005 | 212 | FILED UNDER SEAL - MOTION for Partial Summary Judgment of Non-Infringement (3 \ "EchoStar defendants". (ehs, ) (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/25/2005 | 213 | Received Submission of Documents Pursuant to 8/5/05 order filed by BenQ defendants. Additional attachment(s) added on 8/26/2005 (ehs, ). (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Runner</a> | 08/25/2005 | --  | ***FILED IN ERROR. Document # 213, Submission of Documents. PLEASE IGNORE.** (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Runner</a> | 08/25/2005 | --  | ***FILED IN ERROR. Document # 212, Motion ATTACHED WRONG DOCUMENT. PLEASE IGNORE. (ehs, ) (Entered: 08/26/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/25/2005 | 214 | FILED UNDER SEAL - MOTION for Partial Summary Judgment of Non-Infringement (3 \ "EchoStar defendants". (ehs, ) (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Runner</a> | 08/25/2005 | 215 | TRANSCRIPT of Telephonic Motion Hearing Proceedings held on 8/15/05 at 9:37 a.m. in Court of Honorable US Magistrate Judge Harry W. McKee. Court Reporter: Shea Sloan. (ch, ) (Entered: 08/26/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/25/2005 | 228 | FILED UNDER SEAL - MOTION for Partial Summary Judgment of Infringement of Claim: TIVO Inc. (ehs, ) (Entered: 08/29/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/25/2005 | 229 | FILED UNDER SEAL - DECLARATION of Michelle Armond in Support of motion for partial summary judgment of infringement of claims 1 and 32 by TIVO Inc. (ehs, ) (Entered: 08/29/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/25/2005 | 230 | FILED UNDER SEAL - DECLARATION of Jerry Gibson, Ph.D. in Support of motion for partial summary judgment of infringement of claims 1 and 32 by TIVO Inc. (ehs, ) (Entered: 08/29/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 216 | MOTION for More Definite Statement to Clarify Order of August 17, 2005 by "EchoStar defendants" (Attachments: # 1 Affidavit of Paul A. Friedman# 2 Text of Proposed Order)(Friedman, Paul) (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 217 | ORDER that TIVO make Dr. Gibson available for deposition on 9/15/05. Signed by Judge McKee on 8/26/05. (ehs, ) (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 218 | Second MOTION in Limine To Preclude Evidence/Argument In Front of the Jury Regarding Inequitable Conduct Defense by TIVO Inc. (Attachments: # 1 Text of Proposed Order for Infringement)(Armond, Michelle) (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 219 | Third MOTION in Limine by TIVO Inc. (Attachments: # 1 Affidavit Declaration# 2 Text of Proposed Order)(Armond, Michelle) (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 220 | Fifth MOTION in Limine by TIVO Inc. (Attachments: # 1 Affidavit Declaration# 2 Text of Proposed Order)(Armond, Michelle) (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 221 | FILED UNDER SEAL - MOTION in Limine No. 4: Echostar may not offer evidence or argue other suggestions, inconsistent with the Court's Claim Construction rulings by TIVO Inc. (Entered: 08/26/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 222 | FILED UNDER SEAL - MOTION in Limine No.1: To preclude defendants from introducing making arguments regarding agreements wholly between non-parties by TIVO Inc. (Entered: 08/26/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 223 | MOTION Regarding Estimated Time Required for Trial by "EchoStar defendants". (Attachments: # 1 Text of Proposed Order)(McElhinny, Harold) (Entered: 08/26/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 224 | MOTION Providing Estimate of Total Trial Time by TIVO Inc. (Armond, Michelle) (Entered: 08/26/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 225 | Proposed Pretrial Order by TIVO Inc, EchoStar Communications Corporation, EchoStar I EchoStar Technologies Corporation, Echosphere Limited Liability Company. (Attachments: # 1 Exhibit A# 2 Exhibit Exhibit B# 3 Exhibit Exhibit C# 4 Exhibit Exhibit D# 5 Exhibit Exhibit E# 6 Exhibit Exhibit F# 7 Exhibit Exhibit G# 8 Exhibit Exhibit H# 9 Exhibit Exhibit I# 10 Exhibit Exhibit J# 11 Exhibit Exhibit K# 12 Exhibit Exhibit L# 13 Exhibit Exhibit M)(Lyon, Richard) (Entered: 08/26/2005) |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 226 | MOTION for Leave to File A Surreply Brief In Support of Its Motion for Partial Summary Judgment of Non-Infringement: (1) No Infringement by EchoStar's 7100/7200 Devices; and (2) No Infringement under the Doctrine of Equivalents by "EchoStar defendants". (Attachments: # 1 EchoStar Brief# 2 Text of Proposed Order)(Friedman, Paul) (Entered: 08/26/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 227 | MOTION Motion to Exclude Improperly Withheld Media4 and Burstware Documents and Depositions by TIVO Inc. (Attachments: # 1 Affidavit Declaration# 2 Text of Proposed Order)(Armond, Michelle) (Entered: 08/26/2005)   |

|                          |                        |            |     |  |
|--------------------------|------------------------|------------|-----|--|
| <input type="checkbox"/> | <a href="#">Online</a> | 08/26/2005 | 238 | Minute Entry for proceedings held before Judge H. W. McKee : Telephone Conference f 8/26/2005. (Court Reporter M. Morris.) (mjm, ) (Entered: 08/31/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/29/2005 | 231 | RESPONSE in Opposition re 181 MOTION for Leave to File Second Amended Complaint Satellite LLC filed by "EchoStar defendants". (Attachments: # 1 Affidavit of Paul A. Friedman; # 3 Exhibit 2)(Friedman, Paul) (Entered: 08/29/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/29/2005 | 232 | FILED UNDER SEAL - RESPONSE in Opposition re Echostar's 182 MOTION for Partial Summary Judgment for Damages Period filed by TIVO Inc. (ehs, ) Modified on 9/14/2005 (mpv, ). Modified on 9/14/2005 (mpv, ). (Entered: 08/30/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/29/2005 | 233 | FILED UNDER SEAL - RESPONSE in Opposition to Defendants' re 216 MOTION to Clarify 17, 2005 filed by TIVO Inc. (ehs, ) (Entered: 08/30/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/30/2005 | 234 | REPLY to Response to Motion re 216 MOTION for More Definite Statement to Clarify Or 2005 filed by "EchoStar defendants". (Friedman, Paul) (Entered: 08/30/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/30/2005 | 235 | RESPONSE in Opposition re 189 MOTION for Partial Summary Judgment of Invalidity of Indefiniteness filed by TIVO Inc. (Attachments: # 1 Exhibit 1)(Lyon, Richard) (Entered: 08/30/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/30/2005 | 236 | MOTION for Extension of Time to File by TIVO Inc. (Attachments: # 1 Proposed Order) (Entered: 08/30/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 237 | RESPONSE to Motion re 236 MOTION for Extension of Time to File filed by "EchoStar defendants". (Attachments: # 1 Exhibit 1# 2 Exhibit 2# 3 Text of Proposed Order)(Friedman, Paul) (Entered: 08/31/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 239 | FILED UNDER SEAL - RESPONSE in Opposition re Echostar's 197 MOTION in Limine No. 10 to, use of, and reliance on the expert testimony of Alan Gordon; Declaration of Richard Lyon filed by TIVO Inc. (ehs, ) (Entered: 08/31/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 240 | FILED UNDER SEAL - RESPONSE in Opposition to Echostar's 201 MOTION in Limine No. 11 to, use of, and reliance on doctrine of equivalents filed by TIVO Inc. (ehs, ) (Entered: 08/31/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 241 | RESPONSE in Opposition re 188 MOTION in Limine No. 11 to Preclude Late Disclosed Evidence by TIVO Inc. (Attachments: # 1 Exhibit A)(Lyon, Richard) (Entered: 08/31/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 242 | RESPONSE in Opposition re 198 MOTION in Limine No. 6 filed by TIVO Inc. (Attachment: Declaration)(Lyon, Richard) (Entered: 08/31/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 243 | RESPONSE in Opposition re 196 MOTION in Limine No. 4 (and TiVo's Cross-Motion) filed by TIVO Inc. (Attachments: # 1 Lyon Declaration and Exhibits# 2 Proposed Order Granting Cross-Motion)(Lyon, Richard) (Entered: 08/31/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 244 | RESPONSE in Opposition re 194 MOTION in Limine No. 2 filed by TIVO Inc. (Attachment: Declaration and Exhibits)(Lyon, Richard) (Entered: 08/31/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 245 | MOTION for Reconsideration re 177 Order, by "EchoStar defendants". (Attachments: # 1 Proposed Order)(Friedman, Paul) (Entered: 08/31/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 247 | FILED UNDER SEAL - RESPONSE in Opposition to Echostar's 193 MOTION in Limine No. 12 to, use of, and reliance upon the expert report and testimony of John R Haus Inc. (ehs, ) (Entered: 09/01/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 248 | FILED UNDER SEAL - RESPONSE in Opposition to Echostar's 199 MOTION in Limine No. 13 to, use of, and reliance on alleged conveyed sales of Tivo's Services filed by TIVO Inc. (Attachments: # 1 Additional attachment(s) added on 9/1/2005 (ehs, ). (Entered: 09/01/2005)                               |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 249 | FILED UNDER SEAL - RESPONSE in Opposition to Echostar's 200 MOTION in Limine No. 14 to, use of, and reliance on the expert testimony and opinion of Keith R Ugon filed by TIVO Inc. (ehs, ) (Entered: 09/01/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 250 | FILED UNDER SEAL - RESPONSE in Opposition to Echostar's 202 MOTION in Limine No. 15 to, use of, and reliance on Echostar's other litigation; Declaration of Richard Lyon filed by TIVO Inc. (ehs, ) (Entered: 09/01/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 08/31/2005 | 251 | SEALED RESPONSE in Opposition re 190 MOTION for Partial Summary Judgment of No Infringement filed by TIVO Inc. (mpv, ) (Entered: 09/01/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/01/2005 | 246 | NOTICE by TIVO Inc TIVO's Objections Regarding the Temporal Scope of the August 17, 2005 Order. (Attachments: # 1 Lyon Declaration)(Lyon, Richard) (Entered: 09/01/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/01/2005 | 252 | Minute Entry for proceedings held before Judge David Folsom : Status Conference held 9/1/2005. (Court Reporter Libby Crawford.) (mrm, ) (Entered: 09/01/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/01/2005 | 253 | ORDER; The Court now ORDERS that each side will have 27.5 hours for case presentation time related to JS, opening, closing, and transition statements. terminating 223 Motion for Extension of Time Required for Trial . Signed by Judge David Folsom on 9/1/05. (mrm, ) (Entered: 09/01/2005)         |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/01/2005 | 254 | ORDER; ORDERED that TiVo's shall have one additional day, until 9/2/05, to file its opposition to Echostar's motions in limine. granting 236 Motion for Extension of Time to File . Signed by Judge David Folsom on 9/1/05. (mrm, ) (Entered: 09/01/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/01/2005 | 255 | ORDER; proposed jury questionnaires due 9/12/05 at 5pm. Questionnaires are limited to one per party. ORDERS the parties to jointly determine the size and contents of the jury notebooks. Plaintiff allowed one jury notebook. . Signed by Judge David Folsom on 9/1/05. (mrm, ) (Entered: 09/01/2005) |

|                          |        |            |     |   |
|--------------------------|--------|------------|-----|---|
| <input type="checkbox"/> | Online | 09/01/2005 | 256 | ORDER GRANTING ECHOSTAR'S MOTION FOR LEAVE TO FILE A SURREPLY BRIEF IN SI MOTION FOR PARTIAL SUMMARY JUDGMENT ON NON-INFRINGEMENT: (1) NO INFRIN ECHOSTAR'S 7100/7200 DEVICES; AND (2) NO INFRINGEMENT UNDER THE DOCTRIN EQUIVALENTS; granting 226 Motion for Leave to File . Signed by Judge David Folsom (mrm, ) (Entered: 09/01/2005)  |
| <input type="checkbox"/> | Online | 09/01/2005 | 257 | ECHOSTAR'S SURREPLY OPPOSITION BRIEF IN SUPPORT OF ITS MOTION FOR PARTIA JUDGMENT OF NON-INFRINGEMENT: (1) NO INFRINGEMENT BY ECHOSTAR'S 7100/72 AND (2) NO INFRINGEMENT UNDER THE DOCTRINE OF EQUIVALENTS; re 136 MOTION Summary Judgment of non-infringement filed by "EchoStar defendants". (mrm, ) Modi 9/14/2005 (mpv, ). (Entered: 09/01/2005)  |
| <input type="checkbox"/> | Runner | 09/06/2005 | 258 | SEALED REPLY to Response to Motion re 182 MOTION for Partial Summary Judgment F Period filed by "EchoStar defendants". (mpv, ) (Entered: 09/06/2005)  |
| <input type="checkbox"/> | Online | 09/06/2005 | 259 | REPLY to Response to Motion re 186 MOTION for Leave to File Second Amended Comp Inc. (Lyon, Richard) (Entered: 09/06/2005)  |
| <input type="checkbox"/> | Online | 09/06/2005 | 260 | RESPONSE in Opposition re 195 MOTION in Limine No. 3 filed by TIVO Inc. (Attachmer Declaration# 2 Denny Declaration# 3 Singletary Declaration)(Lyon, Richard) (Entered: 09/06/2005)   |
| <input type="checkbox"/> | Runner | 09/06/2005 | 261 | FILED UNDER SEAL - RESPONSE in Opposition re 228 MOTION for Partial Summary Ju Infringement of Claims 1 and 32 filed by "EchoStar defendants". (mpv, ) (Entered: 09/06/2005)  |
| <input type="checkbox"/> | Runner | 09/07/2005 | 262 | FILED UNDER SEAL - RESPONSE in Opposition re 221 MOTION in Limine #4 Echostar r evidence or argument, or make other suggestions, inconsistent with the Court's Claim Rulings; and Declaration of Karl J. Kramer filed by "EchoStar defendants". (mpv, ) (Enl 09/07/2005)  |
| <input type="checkbox"/> | Runner | 09/07/2005 | 263 | FILED UNDER SEAL - RESPONSE in Opposition re 220 Fifth MOTION in Limine to Preclu agrument relating to the reverse doctrine of equivalents; and Declaration of Karl J. Kra "EchoStar defendants". (mpv, ) (Entered: 09/07/2005)   |
| <input type="checkbox"/> | Runner | 09/07/2005 | 264 | FILED UNDER SEAL - RESPONSE in Opposition re 227 MOTION Motion to Exclude Impr Media4 and Burstware Documents and Witnesses filed by "EchoStar defendants". (mpv 09/07/2005)  |
| <input type="checkbox"/> | Online | 09/07/2005 | 265 | RESPONSE in Opposition re 222 MOTION in Limine No. 1 filed by "EchoStar defendants # 1 Affidavit Lynde Declaration In Support Of Opposition to TIVO's Motion In Limine No Karl) (Entered: 09/07/2005)   |
| <input type="checkbox"/> | Online | 09/07/2005 | 266 | RESPONSE in Opposition re 218 Second MOTION in Limine To Preclude Evidence/Argur the Jury Regarding EchoStar's Inequitable Conduct Defense filed by "EchoStar defenda Karl) (Entered: 09/07/2005)   |
| <input type="checkbox"/> | Online | 09/07/2005 | 267 | RESPONSE in Opposition re 219 Third MOTION in Limine filed by "EchoStar defendants (Entered: 09/07/2005)  |
| <input type="checkbox"/> | Runner | 09/07/2005 | --  | Received SEALED DECLARATION OF NANCY S. HALPIN in Support of Echostar's opposit Motion in Limine No. 1 #265 (mpv, ) (Entered: 09/07/2005)   |
| <input type="checkbox"/> | Runner | 09/07/2005 | --  | Received SEALED Declaration of Karl J. Kramer In Support of Echostar's Opposition to limine No. 2. Attachment to Document #266. (mpv, ) (Entered: 09/07/2005)   |
| <input type="checkbox"/> | Runner | 09/07/2005 | --  | Received SEALED Declaration of Karl J. KRamer in Support of Echostar's opposition to limine Nos. 3A-3C attachment to Document #267. (mpv, ) (Entered: 09/07/2005)   |
| <input type="checkbox"/> | Online | 09/07/2005 | 268 | MOTION for Protective Order Echostar's Motion for a Protective Order Prohibiting TIVO I Discovery in Other Jurisdictions by Echostar Communications Corporation, Echostar DE EchoStar Technologies Corporation, Echosphere Limited Liability Company. (Kramer, K attachment(s) added on 9/13/2005 (fal, ). (Entered: 09/07/2005)  |
| <input type="checkbox"/> | Online | 09/07/2005 | 269 | AFFIDAVIT in Support re 268 MOTION for Protective Order Echostar's Motion for a Prot Prohibiting TiVo from Pursuing Discovery in Other Jurisdictions Declaration of Karl J. Kr of Echostar's Motion for a Protective Order Prohibiting TiVo from Pursuing Discovery in Jurisdictions filed by "EchoStar defendants", Echostar Communications Corporation, Ec Corporation, EchoStar Technologies Corporation, Echosphere Limited Liability Company # 1 Exhibit A# 2 Exhibit B# 3 Exhibit C# 4 Exhibit D# 5 Exhibit E# 6 Exhibit F# 7 Exh H# 9 Exhibit I)(Kramer, Karl) (Entered: 09/07/2005) |
| <input type="checkbox"/> | Online | 09/07/2005 | 270 | REPLY to Response to Motion re 189 MOTION for Partial Summary Judgment of Invalid Indefiniteness filed by "EchoStar defendants". (Harkins, Robert) (Entered: 09/07/2005)  |
| <input type="checkbox"/> | Online | 09/07/2005 | 271 | FILED UNDER SEAL - RESPONSE in Opposition to Echostar's MOTION and Cross Motion Summary Judgment of Infringement of Claims 31 and 61 filed by TIVO Inc. (ehs, ) (En 09/08/2005)   |
| <input type="checkbox"/> | Runner | 09/08/2005 | 272 | TRANSCRIPT of Proceedings (JOINT Status Conference) held on 9/1/2005 before Judge Court Reporter: Libby Crawford. (sm, ) (Entered: 09/08/2005)  |
| <input type="checkbox"/> | Online | 09/08/2005 | 273 | MOTION for Leave to File EchoStar's Unopposed Motion to File Declarations ISO of Rep EchoStar's MIL Nos. 1 & 6-10 by "EchoStar defendants". (Attachments: # 1 Text of Prc Proposed Order Granting Unopposed Motion to File Declarations ISO EchoStar's MIL Nc (Kramer, Karl) (Entered: 09/08/2005)  |

|                          |        |            |     |  |
|--------------------------|--------|------------|-----|--|
| <input type="checkbox"/> | Online | 09/08/2005 | 274 | NOTICE by "EchoStar defendants" re 188 MOTION in Limine No. 11 to Preclude Late Defendant's Notice of Withdrawal of Echostr's August 18, 2005 Motion in Limine No. 11 (Entered: 09/08/2005)  |
| <input type="checkbox"/> | Online | 09/08/2005 | 275 | Joint MOTION to Amend/Correct 207 Order,, Set Scheduling Order Deadlines,, Termina Echostar Communications Corporation, Echostar DBS Corporation, EchoStar Technolog Echosphere Limited Liability Company. (Lyon, Richard) Additional attachment(s) added (fal, ). (Entered: 09/08/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 276 | ORDER GRANTING ECHOSTAR'S UNOPPOSED MOTION TO FILE DECLARATIONS IN SUPPORT OF REPLIES FOR ECHOSTAR'S MOTIONS IN LIMINE NOS. 1 AND 6-10; granting 273 Motion to File . Signed by Judge David Folsom on 9/9/05. (mrm, ) (Entered: 09/09/2005)  |
| <input type="checkbox"/> | Online | 09/09/2005 | 277 | ORDER PER JOINT MOTION TO MODIFY AUGUST 24, 2005 ORDER; granting 275 Motion to Amend/Correct . Signed by Judge David Folsom on 9/9/05. (mrm, ) (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 278 | REPLY to Response to Motion re 193 MOTION in Limine No. 1 filed by "EchoStar defendant Karl" (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 279 | REPLY to Response to Motion re 194 MOTION in Limine No. 2 filed by "EchoStar defendant Karl" (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 280 | REPLY to Response to Motion re 196 MOTION in Limine No. 4 filed by "EchoStar defendant Karl" (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 281 | REPLY to Response to Motion re 197 MOTION in Limine No. 5 filed by "EchoStar defendant Karl" (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 282 | REPLY to Response to Motion re 201 MOTION in Limine No. 9 filed by "EchoStar defendant Karl" (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 283 | REPLY to Response to Motion re 202 MOTION in Limine No. 10 filed by "EchoStar defendant Karl" (Entered: 09/09/2005)  |
| <input type="checkbox"/> | Runner | 09/09/2005 | 284 | FILED UNDER SEAL REPLY to Response to Motion re 198 MOTION in Limine No. 6 with Karl Kramer filed by "EchoStar defendants". (sm, ) (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Runner | 09/09/2005 | 285 | FILED UNDER SEAL REPLY to Response to Motion re 200 MOTION in Limine No. 8 and Karl Kramer filed by "EchoStar defendants". (sm, ) (Entered: 09/09/2005)  |
| <input type="checkbox"/> | Runner | 09/09/2005 | 286 | FILED UNDER SEAL REPLY to Response to Motion re 199 MOTION in Limine No. 7 and Karl Kramer filed by "EchoStar defendants". (sm, ) (Entered: 09/09/2005)  |
| <input type="checkbox"/> | Runner | 09/09/2005 | 287 | FILED UNDER SEAL MOTION for Sanctions/Contempt Order with exhibits by "EchoStar defendants" (sm, ) (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 288 | ORDER Setting Hearing on Motions 188 MOTION in Limine No. 11 to Preclude Late Disclosure of 218 Second MOTION in Limine To Preclude Evidence/Argument In Front of the Jury Regarding EchoStar's Inequitable Conduct Defense, 193 MOTION in Limine, 219 Third MOTION in Limine, 220 Fifth MOTION in Limine, 195 MOTION in Limine, 221 MOTION in Limine, 197 MOTION in Limine, 222 MOTION in Limine, 198 MOTION in Limine, 199 MOTION in Limine, 200 MOTION in Limine, 201 MOTION in Limine, 202 MOTION in Limine, 227 to Exclude Improperly Withheld Media4 and Burstware Documents and Witnesses: Mot to Exclude Initial Pretrial Conference set for 9/22/2005 10:00 AM in Ctrm 319 (Texarkana) before Judge David Folsom. Further ORDERED to attend a Final Pre-trial Conference on 10/4/05 in Texarkana. Signed by Judge David Folsom on 9/9/05. (mrm, ) (Entered: 09/09/2005) |
| <input type="checkbox"/> | Runner | 09/09/2005 | --  | Reset Scheduling Order Deadlines: Initial Pretrial Conference 9/22/05 10:00 Am in Ctrm 319 (Texarkana) before Judge David Folsom. Final Pretrial Conference set for 10/4/2005 10:00 AM in Ctrm 319 (Texarkana) before Judge David Folsom. (mrm, ) (Entered: 09/09/2005)  |
| <input type="checkbox"/> | Online | 09/09/2005 | 289 | MOTION to Strike TiVo Inc.'s Cross Motion Re Partial Summary Judgment of Infringement of '389 Patent and 61 by "EchoStar defendants". (Attachments: # 1 Affidavit of Karl Kramer and exhibit Proposed Order)(Kramer, Karl) (Entered: 09/09/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 290 | FILED UNDER SEAL - DECLARATION of Karl J. Kramer in Support of depts 278 Reply to Motion No. 1 - to preclude reference to, use of, and reliance upon the expert report and testimony of Karl Hauser by "EchoStar defendants". (ehs, ) (Entered: 09/12/2005)  |
| <input type="checkbox"/> | Online | 09/09/2005 | 291 | FILED UNDER SEAL - Declaration of Karl J. Kramer in Support of depts 282 Reply to Motion No. 9 - to preclude evidence on doctrine of equivalents by "EchoStar defendants". (ehs, ) (Entered: 09/12/2005)   |
| <input type="checkbox"/> | Online | 09/09/2005 | 292 | FILED UNDER SEAL - Declaration in Support of depts 283 Reply to Motion in Limine No. 9 - to preclude reference to, use of and reliance upon other EchoStar litigation by "EchoStar defendant Karl" (Entered: 09/12/2005)   |
| <input type="checkbox"/> | Online | 09/12/2005 | 293 | ORDER that EchoStar produce the notes Bozicevic, Field & Francis, LLP created in development concerning infringement of the '389 patent. EchoStar to produce remaining documents and advice it received from counsel before suit was filed concerning infringement of the '389 patent. Each document to be made available for 1 hour of deposition time concerning the notes to be produced regarding infringement of the '389 patent. Signed by Judge H. W. McKee on 9/12/05. (mrm, ) (Entered: 09/12/2005)   |
|                          |        |            |     | NOTICE by TIVO Inc, "EchoStar defendants" Joint Submission of Proposed Juror Questions   |

|                          |        |            |     |  |
|--------------------------|--------|------------|-----|--|
| <input type="checkbox"/> | Online | 09/12/2005 | 294 | (Attachments: # 1 Exhibit A# 2 Exhibit B)(Kramer, Karl) (Entered: 09/12/2005)  |
| <input type="checkbox"/> | Online | 09/12/2005 | 295 | NOTICE of Disclosure by "EchoStar defendants" Pursuant to 35 U.S.C. Section 282 (Fri (Entered: 09/12/2005)   |
| <input type="checkbox"/> | Online | 09/12/2005 | 296 | STATUS REPORT Joint List of Pending Motions Other Than Motions In Limine by TIVO I Communications Corporation, Echostar DBS Corporation, EchoStar Technologies Corpo Echosphere Limited Liability Company. (Lyon, Richard) (Entered: 09/12/2005)                                   |
| <input type="checkbox"/> | Online | 09/13/2005 | 297 | FILED UNDER SEAL REPLY to Response to Motion re 190 MOTION for Summary Judgm Infringement filed by "EchoStar defendants". (mpv, ) (Entered: 09/13/2005)  |
| <input type="checkbox"/> | Online | 09/13/2005 | 298 | REPLY to Response to Motion re 195 MOTION in Limine No. 3-To Preclude Any Referen and Reliance Upon PTO Museum Display, Or Alternatively, To Allow Discovery filed by ' defendants". (Friedman, Paul) (Entered: 09/13/2005)  |
| <input type="checkbox"/> | Online | 09/13/2005 | 299 | NOTICE by "EchoStar defendants" re 246 Notice (Other) Defendants' Opposition to Tivo Regarding the Temporal Scope of the August 17, 2005 Order (Friedman, Paul) (Entere  |
| <input type="checkbox"/> | Online | 09/13/2005 | 300 | FILED UNDER SEAL - Sur-Reply in Opposition to Echostar's 182 MOTION for Partial Sur re damages period filed by TIVO Inc. (ehs, ) (Entered: 09/14/2005)   |
| <input type="checkbox"/> | Online | 09/13/2005 | 301 | FILED UNDER SEAL - Unopposed MOTION for Leave to File Tivo's Reply regarding Tivo' partial summary judgment of infringement of Claims 1 and 32 and Echostar's request f summary judgment of non-infringement of Claims 1 and 32 in excess of page limit by ' (Entered: 09/14/2005) |
| <input type="checkbox"/> | Online | 09/13/2005 | 302 | FILED UNDER SEAL - Opposition to deft's protective motion for reconsideration of the c August 17, 2005 filed by TIVO Inc. (ehs, ) (Entered: 09/14/2005)  |
| <input type="checkbox"/> | Online | 09/13/2005 | 312 | Minute Entry for proceedings held before Judge H. W. McKee : Telephone Conference f 9/13/2005. (Court Reporter M. Morris.) (mjm, ) (Entered: 09/15/2005)   |
| <input type="checkbox"/> | Online | 09/14/2005 | 303 | APPLICATION to Appear Pro Hac Vice by Attorney Emily A Evans for "EchoStar defenda (Entered: 09/14/2005)   |
| <input type="checkbox"/> | Online | 09/14/2005 | 304 | FILED UNDER SEAL - REPLY to Response to Motion re 214 MOTION for Partial Summar Non-Infringement of Claims 31 and 61 filed by "EchoStar defendants". (mpv, ) (Entere   |
| <input type="checkbox"/> | Runner | 09/14/2005 | --  | Pro Hac Vice Filing fee paid by Emily Evans; Fee: \$25, receipt number: 5-1-281 (rml, ) 09/14/2005)  |
| <input type="checkbox"/> | Online | 09/14/2005 | 305 | RESPONSE in Support re 222 MOTION in Limine TIVO'S REPLY IN FURTHER SUPPORT C MOTION IN LIMINE NO. 1: TO PRECLUDE DEFENDANTS FROM INTRODUCING INTO EV. MAKING ARGUMENTS REGARDING AGREEMENTS WHOLLY BETWEEN NON-PARTIES file (Baxter, Samuel) (Entered: 09/14/2005)                |
| <input type="checkbox"/> | Online | 09/14/2005 | 306 | REPLY to Response to Motion re 218 Second MOTION in Limine To Preclude Evidence/A of the Jury Regarding EchoStar's Inequitable Conduct Defense filed by TIVO Inc. (Lyon (Entered: 09/14/2005)  |
| <input type="checkbox"/> | Online | 09/14/2005 | 307 | MOTION for Leave to File Tivo's Reply to Motion to Exclude Improperly Withheld Media Documents and Witnesses by TIVO Inc. (Attachments: # 1 Proposed Order)(Chambers (Entered: 09/14/2005)   |
| <input type="checkbox"/> | Online | 09/14/2005 | 308 | RESPONSE in Opposition re 189 MOTION for Partial Summary Judgment of Invalidity D Indefiniteness filed by TIVO Inc. (Armond, Michelle) (Entered: 09/14/2005)   |
| <input type="checkbox"/> | Online | 09/14/2005 | 309 | RESPONSE in Support re 219 Third MOTION in Limine filed by TIVO Inc. (Armond, Mich 09/14/2005)   |
| <input type="checkbox"/> | Online | 09/14/2005 | 310 | RESPONSE in Support re 221 MOTION in Limine filed by TIVO Inc. (Armond, Michelle) 09/14/2005)  |
| <input type="checkbox"/> | Online | 09/14/2005 | 311 | RESPONSE in Support re 220 Fifth MOTION in Limine filed by TIVO Inc. (Armond, Mich 09/14/2005)   |
| <input type="checkbox"/> | Online | 09/15/2005 | 313 | APPEAL OF MAGISTRATE JUDGE DECISION to District Court by "EchoStar defendants" (Attachments: # 1 Exhibit A)(Friedman, Paul) (Entered: 09/15/2005)  |
| <input type="checkbox"/> | Online | 09/15/2005 | 314 | RESPONSE in Support re 227 MOTION Motion to Exclude Improperly Withheld Media4 i Documents and Witnesses filed by TIVO Inc. (Armond, Michelle) (Entered: 09/15/2005)   |
| <input type="checkbox"/> | Online | 09/15/2005 | 315 | Joint MOTION to Amend/Correct September 9, 2005 Order 277 by TIVO Inc, Echostar Corporation, Echostar DBS Corporation, EchoStar Technologies Corporation, Echospher Company. (Attachments: # 1 Text of Proposed Order Proposed Order)(Lyon, Richard) 09/15/2005)                   |
| <input type="checkbox"/> | Online | 09/16/2005 | 316 | MOTION to Withdraw 188 MOTION in Limine No. 11 to Preclude Late Disclosed Exhibits defendants". (Attachments: # 1 Text of Proposed Order)(Pickett, John) (Entered: 09/1  |
| <input type="checkbox"/> | Online | 09/16/2005 | 317 | RESPONSE in Opposition re 199 MOTION in Limine No. 7: TO PRECLUDE REFERENCE T RELIANCE ON ALLEGED CONVOYED SALES OF TIVO'S SERVICES filed by TIVO Inc. (Ba (Entered: 09/16/2005)   |
| <input type="checkbox"/> | Online | 09/16/2005 | 318 | FILED UNDER SEAL - Sur-Reply in Opposition to Echostar's 198 MOTION in Limine No. reference to, use of, or reliance upon the preamble of any asserted claim as a limitatio   |

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|--------------------------|--------|------------|-----|---|
|                          |        |            |     | Inc. (ehs, ) (Entered: 09/16/2005)  |
| <input type="checkbox"/> | Online | 09/16/2005 | 319 | FILED UNDER SEAL - SUR-REPLY in Opposition to Echostar's 201 MOTION in Limine No evidence on doctrine of equivalents filed by TIVO Inc. (ehs, ) (Entered: 09/16/2005)   |
| <input type="checkbox"/> | Online | 09/16/2005 | 320 | FILED UNDER SEAL - Sur-Reply BRIEF in opposition to Echostar's motion in Limine No. preclude reference to, use of, and reliance upon the expert report and testimony of Jol by "EchoStar defendants". (ehs, ) (Entered: 09/16/2005)   |
| <input type="checkbox"/> | Online | 09/16/2005 | 321 | RESPONSE in Opposition re 200 MOTION in Limine TIVO'S SUR-REPLY BRIEF IN OPPOS ECHOSTAR'S MOTION IN LIMINE NO. 8 [DOC 200] - TO PRECLUDE REFERENCE TO, US RELIANCE UPON THE EXPERT TESTIMONY AND OPINION OF KEITH R. UGONE ON DAM TIVO Inc. (Baxter, Samuel) (Entered: 09/16/2005)                      |
| <input type="checkbox"/> | Online | 09/16/2005 | 322 | RESPONSE in Opposition re 197 MOTION in Limine Sur-Reply filed by TIVO Inc. (Lyon, ) (Entered: 09/16/2005)  |
| <input type="checkbox"/> | Online | 09/16/2005 | 323 | RESPONSE in Opposition re 194 MOTION in Limine Sur-Reply filed by TIVO Inc. (Lyon, ) (Entered: 09/16/2005)  |
| <input type="checkbox"/> | Online | 09/16/2005 | 324 | RESPONSE in Opposition re 202 MOTION in Limine Sur-Reply filed by TIVO Inc. (Lyon, ) (Entered: 09/16/2005)  |
| <input type="checkbox"/> | Online | 09/16/2005 | 325 | RESPONSE in Opposition re 196 MOTION in Limine Sur-Reply filed by TIVO Inc. (Lyon, ) (Entered: 09/16/2005)  |
| <input type="checkbox"/> | Online | 09/19/2005 | 326 | RESPONSE in Opposition re 222 MOTION in Limine Surreply filed by "EchoStar defenda Karl) (Entered: 09/19/2005)  |
| <input type="checkbox"/> | Online | 09/19/2005 | 327 | RESPONSE in Opposition re 220 Fifth MOTION in Limine Surreply filed by "EchoStar dei (Kramer, Karl) (Entered: 09/19/2005)   |
| <input type="checkbox"/> | Online | 09/19/2005 | 328 | RESPONSE in Opposition re 227 MOTION Motion to Exclude Improperly Withheld Media Documents and Witnesses Surreply filed by "EchoStar defendants". (Kramer, Karl) (En 09/19/2005)  |
| <input type="checkbox"/> | Online | 09/19/2005 | 329 | RESPONSE in Opposition re 268 MOTION for Protective Order Echostar's Motion for a P Prohibiting Tivo from Pursuing Discovery in Other Jurisdictions filed by TIVO Inc. (Attar Affidavit Garret Chambers Declaration)(Chambers, Garret) (Entered: 09/19/2005)  |
| <input type="checkbox"/> | Online | 09/19/2005 | 330 | Joint MOTION to Amend/Correct March 3, 2005 Scheduling Order 56 by TIVO Inc, Ech Communications Corporation, Echostar DBS Corporation, EchoStar Technologies Corpo Echosphere Limited Liability Company. (Attachments: # 1 Text of Proposed Order Prop (Lyon, Richard) (Entered: 09/19/2005)            |
| <input type="checkbox"/> | Online | 09/19/2005 | 331 | FILED UNDER SEAL - RENEWED MOTION to Strike 271 Tivo's late Cross-motion for par judgment of Infringement of Claims 31 and 61, or, in the alternative, Echostar's oppos Cross-Motion for partial summary judgment of infringement of claims 31 and 61 by "Ec defendants". (mpv, ) (Entered: 09/20/2005) |
| <input type="checkbox"/> | Online | 09/20/2005 | 332 | ORDER; ORDERED to meet and confer on each of the pending motions in limine, includ filed as dkt no. 227, to determine whether the ptys can reach agreement on any motio motion . Signed by Judge David Folsom on 9/20/05. (mrm, ) (Entered: 09/20/2005)   |
| <input type="checkbox"/> | Online | 09/20/2005 | 333 | ORDER granting 316 Motion to Withdraw 188 MOTION in Limine No. 11 to Preclude Lat Exhibits . Signed by Judge David Folsom on 9/20/05. (mrm, ) (Entered: 09/20/2005)   |
| <input type="checkbox"/> | Online | 09/20/2005 | 334 | FILED UNDER SEAL - SURREPLY to Response to Motion re 228 MOTION for Partial Sum of Infringement of Claims 1 and 32 and ECHOSTAR's Request for Entry of Partial Summ Non-Infringement of Claims 1 and 32 filed by "EchoStar defendants". (mpv, ) (Entered  |
| <input type="checkbox"/> | Online | 09/20/2005 | 335 | ORDER granting 307 Motion for Leave to File Its Reply in Support of Its Motion to Exclt Withheld Media4 and Burstware Documents and Witnesses. TIVo shall have until 9/15/ Reply. Signed by Judge David Folsom on 9/20/05. (mrm, ) (Entered: 09/20/2005)  |
| <input type="checkbox"/> | Online | 09/20/2005 | 336 | ORDER PER JOINT MOTION TO MODIFY SEPTEMBER 9, 2005 ORDER; granting 315 Mol Amend/Correct . Signed by Judge David Folsom on 9/20/05. (mrm, ) (Entered: 09/20/  |
| <input type="checkbox"/> | Online | 09/20/2005 | 337 | REPLY to Response to Motion re 245 MOTION for Reconsideration re 177 Order, filed b defendants". (Attachments: # 1 Affidavit of Paul A. Friedman)(Friedman, Paul) (Entere   |
| <input type="checkbox"/> | Online | 09/20/2005 | 338 | ***FILED IN ERROR. SEE CORRECTED DOCUMENT #344*** RESPONSE to Motion re [ Sanctions Sur-Reply filed by TIVO Inc. (Lyon, Richard) Modified on 9/21/2005 (ehs, ). 09/20/2005)   |
| <input type="checkbox"/> | Online | 09/20/2005 | 339 | Exhibit List Objections by "EchoStar defendants".. (Attachments: # 1 Exhibit A)(Friedn (Entered: 09/20/2005)  |
| <input type="checkbox"/> | Online | 09/20/2005 | 340 | Exhibit List Objections by TIVO Inc.. (Attachments: # 1 Exhibit Objections to EchoStar Exhibit List)(Lyon, Richard) (Entered: 09/20/2005)   |
| <input type="checkbox"/> | Online | 09/20/2005 | 342 | FILED UNDER SEAL - Sur-Reply in Opposition to Echostar's MOTION for Partial Summa no willful infringement filed by TIVO Inc. (ehs, ) (Entered: 09/21/2005)  |
| <input type="checkbox"/> | Online | 09/20/2005 | 343 | FILED UNDER SEAL - TIVO'S (1) Reply in support of TIVO'S Objections re: The tempor. August 17, 2005 Ortder, and (2) Motion for (Proposed) Order Nunc Pro Tunc Extending by TIVO Inc. (ehs, ) (Entered: 09/21/2005)  |



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| <input type="checkbox"/> | <a href="#">Online</a> | 09/21/2005 | 341 | NOTICE of Disclosure by "EchoStar defendants" - Defendants' Pre-Trial Disclosures Under Civil Procedure 26(a)(3) (Pickett, John) (Entered: 09/21/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/21/2005 | 344 | ***REPLACES DOCUMENT #338***WHICH WAS FILED IN ERROR*** RESPONSE to Motion for Partial Summary Judgment of Infringement of Claims 31 and 61 filed by TIVO Inc. (Lyon, Richard) Modified on 9/21/2005 (ehs, ). (Entered: 09/21/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/21/2005 | 345 | RESPONSE in Support re 268 MOTION for Protective Order EchoStar's Motion for a Protective Order Prohibiting TiVo from Pursuing Discovery in Other Jurisdictions Reply Brief in Support of Motion for a Protective Order Prohibiting TiVo from Pursuing Discovery in Other Jurisdictions "EchoStar defendants", EchoStar Communications Corporation, EchoStar DBS Corporation, EchoStar Technologies Corporation, Echosphere Limited Liability Company. (Kramer, Karl) (Entered: 09/21/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/21/2005 | 346 | ORDER, granting 330 Joint MOTION to Amend/Correct March 3, 2005 Scheduling Order filed by EchoStar Communications Corporation,, EchoStar DBS Corporation,, EchoStar Technologies Corporation,, Echosphere Limited Liability Company,. Jury instructions and Verdict Form 9/23/2005. Signed by Judge David Folsom on 9/21/05. (mrm, ) (Entered: 09/21/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/21/2005 | 347 | RESPONSE in Opposition re 289 MOTION to Strike TiVo Inc.'s Cross Motion Re Partial Summary Judgment of Infringement of Claims 31 and 61 filed by TIVO Inc. (Attachments: # 1 To Order)(Giza, Alexander) (Entered: 09/21/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/21/2005 | 348 | RESPONSE in Opposition re 214 MOTION for Partial Summary Judgment TiVo Inc.'s Summary Judgment of Non-Infringement of Claims 31 and 61 filed by TIVO Inc. (Giza, Alexander) (Entered: 09/21/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/22/2005 | 349 | Minute Entry for proceedings held before Judge David Folsom : Motion Hearing held on 9/22/2005. 201 MOTION in Limine filed by "EchoStar defendants", 227 MOTION Motion to Exclude Withheld Media4 and Burstware Documents and Witnesses filed by TIVO Inc., 202 MOTION in Limine filed by "EchoStar defendants", 218 Second MOTION in Limine To Preclude Evidence/Arguments of the Jury Regarding EchoStar's Inequitable Conduct Defense filed by TIVO Inc., 193 MOTION in Limine filed by "EchoStar defendants", 219 Third MOTION in Limine filed by TIVO Inc., 194 MOTION in Limine filed by "EchoStar defendants", 220 Fifth MOTION in Limine filed by TIVO Inc., 195 MOTION in Limine filed by "EchoStar defendants", 221 MOTION in Limine filed by TIVO Inc., 196 MOTION in Limine filed by "EchoStar defendants", 222 MOTION in Limine filed by TIVO Inc., 197 MOTION in Limine filed by "EchoStar defendants", 198 MOTION in Limine filed by "EchoStar defendants", 199 MOTION in Limine filed by "EchoStar defendants", 200 MOTION in Limine filed by "EchoStar defendants", Libby Crawford.) (mrm, ) (Entered: 09/22/2005) |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/22/2005 | 350 | Joint MOTION for Extension of Time to File Response/Reply Briefs re Motion for Contempt of Court [287] by TIVO Inc, EchoStar Communications Corporation, EchoStar DBS Corporation, EchoStar Technologies Corporation, Echosphere Limited Liability Company. (Lyon, Richard) Additional attachments added on 9/23/2005 (mpv, ). (Entered: 09/22/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/22/2005 | 351 | FILED UNDER SEAL - Surreply in further in Opposition to EchoStar's Motion for Partial Summary Judgment of Non-Infringement of Claims 31 and 61 (#214) filed by TIVO Inc. (ehs, ) (Entered: 09/23/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/22/2005 | 352 | FILED UNDER SEAL - RESPONSE in Opposition to EchoStar's [287] MOTION for Contempt of Court TIVO Inc. (ehs, ) (Entered: 09/23/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/23/2005 | 353 | NOTICE by "EchoStar defendants" of Filing of Correspondence Regarding Deposition of Further Opposition to Tivo's Motion to Exclude (Attachments: # 1 Exhibit A)(Kramer, Karl) (Entered: 09/23/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/23/2005 | 354 | ***SEE CORRECTED ORDER # 357*** ORDER; ORDERS: EchoStar to produce all notes, communications, or other documentation created by or relating to the infringement analysis undertaken by Bozicevic, Field & Frances, LLP, at any time; EchoStar to produce Merchant & Gould opinions and all notes, communications, or other documentation related to the infringement analysis of the '389 patent undertaken by Merchant & Gould. EchoStar is to produce materials within 7 days of this order. The Court further ORDERS EchoStar to produce Frank Becking, Alan Cannon, Kerry Miller, Homer Knearl and Timothy Scull for deposition concerning the '389 patent and any potential infringement by EchoStar. TiVo is granted an additional deposition time; These witnesses are not be made available no later than 10/14/05 . Signed by Judge David Folsom on 9/23/05. (mrm, ) Modified on 9/26/2005 (mrm, ). (Entered: 09/23/2005)  |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/23/2005 | 355 | NOTICE by "EchoStar defendants" 35 U.S.C. Section 282 Supplemental Disclosure (Filed) (Entered: 09/23/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/23/2005 | 356 | Proposed Jury Instructions by TIVO Inc, "EchoStar defendants". (Attachments: # 1 Exhibit Exhibit B# 3 Exhibit Exhibit C# 4 Exhibit Exhibit D# 5 Exhibit Exhibit E# 6 Exhibit Exhibit F) (Lyon, Richard) (Entered: 09/23/2005)   |
| <input type="checkbox"/> | <a href="#">Online</a> | 09/26/2005 | 357 | ***REPLACES ORDER # 354*** ORDER; ORDERS: EchoStar to produce all notes, communications, or other documentation created by or relating to the infringement analysis of the '389 patent undertaken by Bozicevic, Field & Frances, LLP, at any time; EchoStar to produce the two Merchant & Gould opinions and all notes, communications, or other documentation related to any infringement analysis of the '389 patent undertaken by Merchant & Gould. EchoStar is to produce these materials within 7 days of this order. The Court further ORDERS EchoStar to produce Frank Becking, Alan Cannon, Kerry Miller, Homer Knearl and Timothy Scull for deposition concerning the '389 patent and any potential infringement by EchoStar. TiVo is granted an additional deposition time; These witnesses are not be made available no later than 10/14/05 . Signed by Judge David Folsom on 9/26/05. (mrm, ) Modified on 9/26/2005 (mrm, ). (Entered: 09/26/2005)  |

|                          |        |            |     |  |
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|                          |        |            |     | Knearl and Timothy Scull for deposition concerning their analysis of the '389 patent an infringement by Echostar. TiVo is granted an additional 5 hrs of deposition time; These not be made available no later than 10/14/05 . Signed by Judge David Folsom on 9/26 (Entered: 09/26/2005)  |
| <input type="checkbox"/> | Online | 09/26/2005 | 358 | ORDER PER JOINT MOTION FOR EXTENSION TO SERVE AND FILE BRIEFS RE MOTION ORDER; granting 350 Motion for Extension of Time to File Response/Reply re [287] MC Sanctions Responses due by 9/22/2005 Replies due by 9/30/2005. Signed by Judge David Folsom on 9/26/05. (mrm, ) (Entered: 09/26/2005)  |
| <input type="checkbox"/> | Online | 09/26/2005 | 360 | FILED UNDER SEAL - REPLY in Support of its Cross-Motion #271 for Partial Summary Judgment of Infringement of Claims 31 and 61 by TIVO Inc. (ehs, ) (Entered: 09/28/2005)   |
| <input type="checkbox"/> | Online | 09/27/2005 | 359 | NOTICE by "EchoStar defendants" of Compliance (Evans, Emily) (Entered: 09/27/2005)   |
| <input type="checkbox"/> | Online | 09/27/2005 | 361 | ORDER finding as moot [81] Motion to Compel, finding as moot 85 Motion to Compel, finding as moot [87] Motion to Compel, finding as moot 88 Motion to Compel, finding as moot 118 Motion to Compel Signed by Judge H. W. McKee on 9/27/05. (ehs, ) (Entered: 09/28/2005)   |
| <input type="checkbox"/> | Online | 09/28/2005 | 362 | REPLY to Response to Motion re 289 MOTION to Strike TiVo Inc.'s Cross Motion Re Partial Judgment of Infringement of Claims 31 and 61 filed by "EchoStar defendants". (Kramer, ) (Entered: 09/28/2005)  |
| <input type="checkbox"/> | Online | 09/29/2005 | 363 | ORDER to produce Dr. Rhyne for 2 hours of deposition time before 10/14/05. Signed by Judge H. W. McKee on 9/29/05. (ehs, ) (Entered: 09/29/2005)   |
| <input type="checkbox"/> | Online | 09/29/2005 | 364 | FILED UNDER SEAL REPLY to Response to Motion re [287] MOTION for Sanctions/Contempt on Tivo's violation of the protective order filed by "EchoStar defendants". (mpv, ) (Entered: 09/29/2005)  |
| <input type="checkbox"/> | Online | 09/30/2005 | 365 | Exhibit List Trial Exhibit List by TIVO Inc.. (Attachments: # 1 Supplement Part 2 of trial exhibit list# 3 Supplement Part 3 of trial exhibit list# 4 Supplement Part 4 of trial exhibit list# 5 Supplement Part 5 of trial exhibit list# 6 Supplement Part 6 of trial exhibit list# 7 Supplement Part 7 of trial exhibit list# 8 Supplement Part 8 of trial exhibit list# 9 Supplement Part 9 of trial exhibit list)(Giza, Alexander) (Entered: 09/30/2005) |
| <input type="checkbox"/> | Online | 09/30/2005 | 366 | Exhibit List Objections to EchoStar's Trial Exhibit List by TIVO Inc.. (Attachments: # 1 Supplement Part 2 to Objections to EchoStar's Trial Exhibit List# 2 Supplement Part 3 to Objections to EchoStar's Trial Exhibit List# 3 Supplement Part 4 to Objections to EchoStar's Trial Exhibit List# 4 Supplement Part 5 to Objections to EchoStar's Trial Exhibit List)(Giza, Alexander) (Entered: 09/30/2005)  |
| <input type="checkbox"/> | Online | 09/30/2005 | 367 | Proposed Pretrial Order Amendments to Exhibits D, H, and K by "EchoStar defendants" # 1 Exhibit D (Revised)# 2 Exhibit H (Amended) Part 1# 3 Exhibit H (Amended) part 2 (Addendum 1)# 5 Exhibit K (Addendum 2))(Kramer, Karl) (Entered: 09/30/2005)  |
| <input type="checkbox"/> | Online | 09/30/2005 | 368 | Exhibit List Objections by "EchoStar defendants".. (Attachments: # 1 Exhibit A)(Kramer, Karl) (Entered: 09/30/2005)  |
| <input type="checkbox"/> | Online | 09/30/2005 | 369 | NOTICE of Disclosure by "EchoStar defendants" Pursuant to Rule 26(a)(3) "Expect to be Disclosed" (Attachments: # 1 Exhibit A)(Kramer, Karl) (Entered: 09/30/2005)  |
| <input type="checkbox"/> | Online | 09/30/2005 | 371 | APPLICATION to Appear Pro Hac Vice by Attorney Kristina Paszek for "EchoStar defendants" (Entered: 10/03/2005)   |
| <input type="checkbox"/> | Runner | 09/30/2005 | --  | Pro Hac Vice Filing fee paid by Kristina Paszek; Fee: \$25, receipt number: 5-1-300 (rml, ) (Entered: 10/03/2005)  |
| <input type="checkbox"/> | Online | 10/03/2005 | 370 | NOTICE of Disclosure by "EchoStar defendants" - Defendants' Supplemental Pre-Trial Order Pursuant to Federal Rule of Civil Procedure 26(a)(3) (Pickett, John) (Entered: 10/03/2005)  |
| <input type="checkbox"/> | Online | 10/03/2005 | 372 | Proposed Pretrial Order Exhibit I - Addendum by TIVO Inc. (Lyon, Richard) (Entered: 10/03/2005)  |
| <input type="checkbox"/> | Online | 10/03/2005 | 373 | NOTICE by TIVO Inc of Compliance with Fed. R. Civ. Proc. 26(a)(3) (Lyon, Richard) (Entered: 10/03/2005)  |
| <input type="checkbox"/> | Online | 10/03/2005 | 374 | FILED UNDER SEAL - Surreply in support of deft's RESPONSE in Opposition re Tivo's 3:05-cv-00001-Strike 271 Response in Opposition to Motion for partial summary judgment of infringement of claims 31 and 61 filed by "EchoStar defendants". (ehs, ) (Entered: 10/04/2005)   |
| <input type="checkbox"/> | Online | 10/04/2005 | 375 | Minute Entry for proceedings held before Judge David Folsom : Initial Pretrial Conference held on 10/4/2005. (Court Reporter Libby Crawford.) (mrm, ) (Entered: 10/05/2005)  |
| <input type="checkbox"/> | Online | 10/05/2005 | 376 | APPLICATION to Appear Pro Hac Vice by Attorney Alison M Tucher for Echostar Comm. Corporation; Echostar DBS Corporation; Echostar Communications Corporation; Echostar Liability Company. (rml, ) (Entered: 10/05/2005)  |
| <input type="checkbox"/> | Runner | 10/05/2005 | --  | Pro Hac Vice Filing fee paid by Alison Tucher; Fee: \$25, receipt number: 5-1-303 (rml, ) (Entered: 10/05/2005)  |
| <input type="checkbox"/> | Online | 10/05/2005 | 377 | RESPONSE in Opposition re 289 MOTION to Strike TiVo Inc.'s Cross Motion Re Partial Summary Judgment of Infringement of Claims 31 and 61 (Sur-Reply) filed by TIVO Inc. (Giza, Alexander) (Entered: 10/05/2005)   |
| <input type="checkbox"/> | Runner | 10/06/2005 | 378 | SEALED TRANSCRIPT of Proceedings (Motions in Limine, Excerpt of Proceedings regarding 9/22/2005 before Judge David Folsom. Court Reporter: Libby Crawford. (sm, ) (Entered: 10/06/2005)  |

|                          |        |            | 10/06/2005)   |
|--------------------------|--------|------------|---|
| <input type="checkbox"/> | Runner | 10/06/2005 | 379 TRANSCRIPT of Proceedings (Motions in Limine except for a portion of which is excerpt under separate cover - #378) held on September 22, 2005 before Judge David Folsom Libby Crawford. (sm, ) (Entered: 10/06/2005)  |
| <input type="checkbox"/> | Online | 10/06/2005 | 380 ORDER OF CLARIFICATION OF THE COURT'S SEPTEMBER 26,2005 OPINION AND ORD (attachments with order are Exhibit 1 and Exhibit 2). Signed by Judge David Folsom or (mrm, ) Modified on 10/6/2005 (mrm, ). (Entered: 10/06/2005)  |
| <input type="checkbox"/> | Online | 10/06/2005 | 381 ORDER granting 268 Motion for Protective Order Prohibiting TiVo from Pursuing Discov Jurisdictions. Signed by Judge David Folsom on 10/6/05. (mrm, ) (Entered: 10/06/2005)  |
| <input type="checkbox"/> | Online | 10/06/2005 | 382 STIPULATION re 218 Second MOTION in Limine To Preclude Evidence/Argument In Fro Regarding EchoStar's Inequitable Conduct Defense As Moot by TIVO Inc, "EchoStar del (Kramer, Karl) (Entered: 10/06/2005)  |
| <input type="checkbox"/> | Online | 10/06/2005 | 384 FILED UNDER SEAL - Sur-Reply in Opposition to Echostar's [287] MOTION for a conten TIVO Inc. (ehs, ) (Entered: 10/07/2005)  |
| <input type="checkbox"/> | Online | 10/07/2005 | 383 Emergency MOTION to Stay Court's Order of October 6, 2005 by Echostar Communal Echostar DBS Corporation, EchoStar Technologies Corporation, Echosphere Limited Lia (Attachments: # 1 Text of Proposed Order Proposed Order# 2 Text of Proposed Order Proposed Order)(McElhinny, Harold) (Entered: 10/07/2005)   |
| <input type="checkbox"/> | Online | 10/07/2005 | 385 RESPONSE to Motion re 383 Emergency MOTION to Stay Court's Order of October 6, 2 Inc. (Baxter, Samuel) (Entered: 10/07/2005)  |
| <input type="checkbox"/> | Online | 10/07/2005 | 386 ORDER GRANTING DEFENDANTS' REQUEST FOR AN EMERGENCY STAY OF THE COURT OCTOBER 6, 2005; granting 383 Emergency MOTION to Stay Court's Order of October by Judge David Folsom on 10/7/06. (mrm, ) (Entered: 10/07/2005)   |
| <input type="checkbox"/> | Online | 10/07/2005 | 387 Proposed Jury Instructions by TIVO Inc, "EchoStar defendants". (Lyon, Richard) (Enter   |
| <input type="checkbox"/> | Online | 10/11/2005 | 388 STATUS REPORT TIVO'S REPORT ON ITS OBJECTIONS TO DEFENDANTS' EXHIBITS by (Baxter, Samuel) (Entered: 10/11/2005)   |
| <input type="checkbox"/> | Online | 10/11/2005 | 389 NOTICE by TIVO Inc NOTICE OF LODGING OF TIVO'S DESIGNATED DEPOSITION TEST FIRST WEEK OF TRIAL (Baxter, Samuel) (Entered: 10/11/2005)  |
| <input type="checkbox"/> | Runner | 10/11/2005 | 390 TRANSCRIPT of Pre-Trial Hearing Proceedings held on 10/4/05 at 9:55 a.m. In Texark Honorab Judge David Folsom. Court Reporter: Libby Crawford. (ch, ) (Entered: 10/11/2005)   |
| <input type="checkbox"/> | Online | 10/11/2005 | 391 NOTICE by "EchoStar defendants" of Filing of Petition for Writ of Mandamus in the U.S. for the Federal Circuit (Attachments: # 1 Exhibit A (Writ)# 2 Exhibit A (Addendum par (Addendum part 2)# 4 Exhibit A (Addendum part 3))(Tucher, Alison) (Entered: 10/11/2005)  |
| <input type="checkbox"/> | Online | 10/11/2005 | 392 Minute Entry for proceedings held before Judge David Folsom : Final Pretrial Conferenc 10/11/2005. (Court Reporter Libby Crawford.) (mrm, ) (Entered: 10/12/2005)   |
| <input type="checkbox"/> | Online | 10/14/2005 | 393 FILED UNDER SEAL NOTICE OF FILING LETTER BRIEF filed per Judge's request by "Ech defendants". (mpv, ) (Entered: 10/14/2005)   |
| <input type="checkbox"/> | Online | 10/14/2005 | 394 NOTICE by "EchoStar defendants" of Order from the Court of Appeals for the Federal C Briefing Concerning EchoStar's Writ of Mandamus (Kramer, Karl) (Entered: 10/14/2005)   |
| <input type="checkbox"/> | Online | 10/14/2005 | 395 NOTICE by "EchoStar defendants" of Filing of Letter Brief (Kramer, Karl) (Entered: 10/14/2005)  |
| <input type="checkbox"/> | Online | 10/14/2005 | 396 MOTION for Extension of Time to File UNOPPOSED MOTION BY PLAINTIFF TiVo INC. TC FOR LODGING OF DEPOSITION TESTIMONY THAT TiVo EXPECTS TO OFFER DURING THE FIRST WEEK OF TRIAL AND MATERIALS RELATED THERETO by TIVO Inc. (Attachments: # 1 Text of Proposed Order)(Byrd, Christine) (Entered: 10/14/2005)   |
| <input type="checkbox"/> | Online | 10/17/2005 | 397 ORDER; Therefore, it is hereby ORDERED that trial in this case is CONTINUED until Ma further ORDERED that all motion practice is hereby STAYED unless leave from this Cou obtained and all discovery is STAYED pending a status conference to be scheduled whe more information concerning its November schedule . Signed by Judge David Folsom o (mrm, ) (Entered: 10/17/2005) |
| <input type="checkbox"/> | Online | 10/17/2005 | 399 Received NOTICE OF DOCKETING from USCA that a petition for writ of mandamus has the court. MISC NO 803 on 10/12/05 (ehs, ) (Entered: 10/18/2005)  |
| <input type="checkbox"/> | Online | 10/18/2005 | 398 ORDER ON UNOPPOSED MOTION BY PLAINTIFF TiVo INC. TO EXTEND DATE FOR LODG DEPOSITION TESTIMONY THAT TiVo EXPECTS TO OFFER DURING THE FIRST WEEK OF MATERIALS RELATED THERETO; granting 396 Motion for Extension of Time to File . Sig David Folsom on 10/17/05. (mrm, ) (Entered: 10/18/2005)  |
| <input type="checkbox"/> | Runner | 10/18/2005 | 400 TRANSCRIPT of Proceedings/Pretrial Hearing held on 10/11/05 before Judge David Folsom Reporter: Libby Crawford. (mpv, ) (Entered: 10/19/2005)   |
| <input type="checkbox"/> | Online | 10/20/2005 | 401 APPLICATION to Appear Pro Hac Vice by Attorney Charles Conrow Murphy, Jr for Merc (mpv, ) (Entered: 10/20/2005)   |
| <input type="checkbox"/> | Runner | 10/20/2005 | -- Pro Hac Vice Filing fee paid by Charles Conrow Murphy Jr; Fee: \$25, receipt number: 5 (Entered: 10/20/2005)   |

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**US District Court Civil Docket**

**U.S. District - California Northern  
(Oakland)**

**4:02cv365**

**Tivo Inc, v. Sonicblue Incorporated et al**

This case was retrieved from the court on Friday, August 22, 2003

|   |  |
|---|--|
| <b>Date Filed:</b> 01/23/2002                 | <b>Class Code:</b> ADRMOP, CLOSED      |
| <b>Assigned To:</b> Honorable D Lowell Jensen | <b>Closed:</b> yes                     |
| <b>Referred To:</b>                           | <b>Statute:</b> <a href="#">35:271</a> |
| <b>Nature of suit:</b> Patent (830)           | <b>Jury Demand:</b> Both               |
| <b>Cause:</b> Patent Infringement             | <b>Demand Amount:</b> \$0              |
| <b>Lead Docket:</b> None                      | <b>NOS Description:</b> Patent         |
| <b>Other Docket:</b> None                     |  |
| <b>Jurisdiction:</b> Federal Question         |  |

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|--------------------------|--------------|------------|-----|--|-----|
| <input type="checkbox"/> | Runner       | 01/23/2002 | 1   | COMPLAINT for Patent Infringement against Replaytv, Inc., Sonicblue Incorporated (File receipt number 5504550). Filed by Tivo Inc., (hdj, ) (Entered: 01/30/2002)  |     |
| <input type="checkbox"/> | Runner       | 01/23/2002 | 2   | ADR SCHEDULING ORDER: Case Management Statement due by 5/16/2002. Case Management Conference set for 5/23/2002 at 10:00 AM. (hdj, ) (Entered: 01/30/2002)  |     |
| <input type="checkbox"/> | Runner       | 01/23/2002 | --  | Summons Issued as to Replaytv, Inc. ; Sonicblue Incorporated (hdj, ) (Entered: 01/30/2002)   |     |
| <input type="checkbox"/> | Runner       | 01/29/2002 | 3   | SUMMONS Returned Executed, by Tivo Inc., Replaytv, Inc. ; Sonicblue Incorporated (Entered: 01/31/2002)   |     |
| <input type="checkbox"/> | Runner       | 02/11/2002 | 4   | NOTICE of Related Case 01-4865-RMW by Replaytv, Inc., Sonicblue Incorporated. (hdj 02/12/2002)   |     |
| <input type="checkbox"/> | Runner       | 02/11/2002 | 5   | ANSWER to Complaint, COUNTERCLAIM against Tivo Inc., by Replaytv, Inc., Sonicblue (hdj, ) (Entered: 02/12/2002)  |     |
| <input type="checkbox"/> | Runner       | 02/11/2002 | 6   | Certificate of Interested Entities by Replaytv, Inc., Sonicblue Incorporated. (hdj, ) (Entered: 02/12/2002)  |     |
| <input type="checkbox"/> | Runner       | 02/19/2002 | 7   | Declination to Proceed Before a U.S. Magistrate Judge by Replaytv, Inc., Sonicblue Incorporated (Entered: 02/20/2002)  |     |
| <input type="checkbox"/> | Runner       | 02/26/2002 | 8   | NOTICE re 4 Opposition to Defendants' Notice of Related Cases by Tivo Inc., (hdj, ) (Entered: 02/27/2002)  |     |
| <input type="checkbox"/> | Runner       | 03/01/2002 | 9   | Reply ANSWER to Counterclaim by Tivo Inc., (hdj, ) (Entered: 03/04/2002)   |     |
| <input type="checkbox"/> | Runner       | 03/11/2002 | 10  | Reply to Opposition re 8 filed by Replaytv, Inc., Sonicblue Incorporated. (hdj, ) (Entered: 03/14/2002)  |     |
| <input type="checkbox"/> | Runner       | 03/13/2002 | 11  | ORDER Impending Reassignment to a United States District Court Judge. Signed by Judge Maria-Elena James on 3/13/02. (hdj, ) (Entered: 03/14/2002)  |     |
| <input type="checkbox"/> | Runner       | 03/13/2002 | 12  | ORDER REASSIGNING CASE. Case reassigned to Judge D. Lowell Jensen for all further proceedings. Judge Maria-Elena James no longer assigned to case. Signed by Judge Executive Committee on 3/13/02. (hdj, ) (Entered: 03/15/2002) |     |
| <input type="checkbox"/> | Runner       | 03/20/2002 | 13  | CLERK'S NOTICE Case Management Conference set for 6/7/2002 at 01:30 PM. Case Management Statement due by 5/28/2002. (kc, ) (Entered: 03/25/2002)   |     |
| <input type="checkbox"/> | Online       | 04/09/2002 | 14  | ORDER NOT RELATING CASE to C-01-21198-RMW. Signed by Judge Ronald M. Whyte. Additional attachment(s) added on 4/17/2002 (jv, ). Modified on 4/17/2002 to reflect it is assigned to C-02-365 (jv, ). (Entered: 04/09/2002)        |     |
| <input type="checkbox"/> | Runner       | 04/17/2002 | 15  | AMENDED ORDER: deeming C01-21198RMW and C02-365DLJ NOT RELATED . Signed by Judge Ronald M. Whyte on 4/9/02. (kk, ) (Entered: 05/02/2002)   |     |
| <input type="checkbox"/> | Runner       | 05/10/2002 | 16  | STIPULATION selecting Mediation by Replaytv, Inc., Sonicblue Incorporated, Tivo Inc., (Entered: 05/10/2002)  |     |
| <input type="checkbox"/> | Runner       | 06/21/2002 | --  | Received Document stipulation & proposed order resetting initial case management conference for Tivo Inc., (kk, ) (Entered: 06/24/2002)  |     |
| <input type="checkbox"/> | Runner       | 06/27/2002 | 17  | STIPULATION AND ORDER resetting Case Management Conference for 10/18/2002 at 10:00 AM. (kk, ) (Entered: 06/27/2002)  |     |



|                          |        |            |    |  |
|--------------------------|--------|------------|----|--|
| <input type="checkbox"/> |        |            |    | by Judge D. Lowell Jensen on 6/27/02. (kc, ) (Entered: 06/28/2002)   |
| <input type="checkbox"/> | Runner | 11/12/2002 | 18 | Stipulation and ORDER DISMISSING CASE without prejudice, each party to bear its ow<br>by Judge D. Lowell Jensen on 11/12/02. (kc,) (Entered: 11/14/2002) |
| <input type="checkbox"/> | Runner | 12/13/2002 | 19 | NOTICE re 18 by Replaytv, Inc., Sonicblue Incorporated. (kk, ) (Entered: 12/16/2002)   |

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**US District Court Civil Docket**

**U.S. District - Georgia Northern  
(Atlanta)**

**1:05mi208**

**Tivo, Inc v. Echostar Communications Corporation et al**

This case was retrieved from the court on Wednesday, September 14, 2005

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|  |                                |
|--|--------------------------------|
| <b>Date Filed:</b> 07/21/2005                                  | <b>Class Code:</b> CLOSED      |
| <b>Assigned To:</b> Judge William S Duffey, Jr                 | <b>Closed:</b> yes             |
| <b>Referred To:</b>  | <b>Statute:</b>                |
| <b>Nature of suit:</b> Patent (830)                            | <b>Jury Demand:</b> None       |
| <b>Cause:</b> FRCP 37(a) Motion to compel deposition testimony | <b>Demand Amount:</b> \$0      |
| <b>Lead Docket:</b> None                                       | <b>NOS Description:</b> Patent |
| <b>Other Docket:</b> USDC ED TX, 04cv01 DF                     |                                |
| <b>Jurisdiction:</b> Federal Question                          |                                |

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Movant

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|--------------------------|--------------|------------|-----|---|
| <input type="checkbox"/> | Online       | 07/21/2005 | 1   | MOTION to Compel production of a document from third party Scientific Atlanta with B Echostar Technologies Corporation, Echosphere Limited Liability Company, Echostar Cc Corporation, EchoStar DBS Corporation. (Attachments: # 1 Exhibit 1# 2 Exhibit A# 3 I Exhibit C# 5 Exhibit D# 6 Exhibit E# 7 Exhibit F# 8 Exhibit G)(fmm) (Entered: 07/22/ |
| <input type="checkbox"/> | Online       | 07/28/2005 | 2   | Withdrawal of Motion 1 MOTION to Compel production of a document from third party filed by Echostar Communications Corporation,, Echostar Technologies Corporation,, E Corporation,, Echosphere Limited Liability Company,. (Murphy, Charles) (Entered: 07/   |
| <input type="checkbox"/> | Runner       | 07/28/2005 | --  | Miscellaneous Case Terminated. (fmm) (Entered: 07/29/2005)  |

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**1:05mi190**

**Tivo, Inc v. Echostar Communications Corporation et al**

This case was retrieved from the court on Thursday, October 20, 2005

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|   |                                |
|---|--------------------------------|
| <b>Date Filed:</b> 07/07/2005                               | <b>Class Code:</b>             |
| <b>Assigned To:</b> Judge William S Duffey, Jr              | <b>Closed:</b> no              |
| <b>Referred To:</b>   | <b>Statute:</b>                |
| <b>Nature of suit:</b> Patent (830)                         | <b>Jury Demand:</b> None       |
| <b>Cause:</b> FRCP 45(b) Motion to quash or modify subpoena | <b>Demand Amount:</b> \$0      |
| <b>Lead Docket:</b> None                                    | <b>NOS Description:</b> Patent |
| <b>Other Docket:</b> USDC ED TX, 2-04cv01 DF                |                                |
| <b>Jurisdiction:</b> Federal Question                       |                                |

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| <input type="checkbox"/> | Online       | 07/26/2005 | 2   | PROPOSED CONSENT ORDER For Extension of Time re: 1 MOTION to Quash subpoenas William) (Entered: 07/26/2005)  |     |
| <input type="checkbox"/> | Online       | 07/27/2005 | 6   | APPLICATION for Admission of Harold J. McElhinny Pro Hac Viceby Echostar Technolog Echosphere Limited Liability Company, Homer Knearl, Echostar Communications Corpo DBS Corporation.Filing Fee received \$150.00, Receipt #539834. (fmm) (Entered: 07/2   |     |
| <input type="checkbox"/> | Online       | 07/27/2005 | 7   | APPLICATION for Admission of Peter P. Meringolo Pro Hac Viceby Echostar Technologie Echosphere Limited Liability Company, Homer Knearl, Echostar Communications Corpo DBS Corporation.Filing Fee received \$150.00, Receipt #539834. (fmm) (Entered: 07/2  |     |
| <input type="checkbox"/> | Online       | 07/27/2005 | 8   | APPLICATION for Admission of Marc J. Pernick Pro Hac Viceby Echostar Technologies C Echosphere Limited Liability Company, Homer Knearl, Echostar Communications Corpo DBS Corporation.Filing Fee received \$150.00, Receipt #539835. (fmm) (Entered: 07/2  |     |
| <input type="checkbox"/> | Online       | 07/28/2005 | 3   | NOTICE of Appearance by William Charles Buhay on behalf of TiVo, Inc. (Buhay, Williar 07/28/2005)  |     |
| <input type="checkbox"/> | Online       | 07/28/2005 | 4   | Second MOTION for Extension of Time Reply to Motion for Protective Order and to Qua to Quash subpoenas, 2 Proposed Consent Order with Brief In Support by TiVo, Inc.. (B (Entered: 07/28/2005)   |     |
|                          |              |            |     | PROPOSED ORDER Unopposed Motion to Extend Time to Reply to Motion for Protective   |     |

|                          |        |            |    |   |
|--------------------------|--------|------------|----|---|
| <input type="checkbox"/> | Online | 07/28/2005 | 5  | Quash re: 4 Second MOTION for Extension of Time Reply to Motion for Protective Order re: 1 MOTION to Quash subpoenas, 2 Proposed Consent Order. (Buhay, William) (Entered: 07/28/2005)  |
| <input type="checkbox"/> | Online | 07/28/2005 | 9  | ORDER GRANTING 4 Motion for Extension of Time. IT IS HEREBY ORDERED that Plaintiff three additional days in which to file its response to the Joint Motion . Signed by Judge Duffey Jr. on 7/26/05. (kt) (Entered: 07/29/2005)  |
| <input type="checkbox"/> | Online | 08/01/2005 | 10 | ORDER GRANTING 5 Unopposed Motion to Extend time until 8/4/05 for TiVo to reply to Non-Party Homer Knearl's Joint Motion for a Protective Order and to Quash Rule 45 Subpoena by Judge William S. Duffey Jr. on 8/1/05. (kt) (Entered: 08/02/2005)  |
| <input type="checkbox"/> | Runner | 08/02/2005 | -- | ORDER (by docket entry only) granting 6 Application for Admission Pro Hac Vice of Har granting 7 Application for Admission Pro Hac Vice of Peter Meringolo, granting 8 Application Pro Hac Vice of Marc Pernick . Ordered by Judge William S. Duffey Jr. on 8/2/05. (Entered: 08/02/2005)   |
| <input type="checkbox"/> | Online | 08/03/2005 | 13 | ORDER APPROVING 11 Third MOTION for Extension of Time to Reply to EchoStar and Homer Knearl's Joint Motion for Protective Order and 1 Motion to Quash Rule 45 Subpoenas ui Signed by Judge William S. Duffey Jr. on 8/5/05. (kt) (Entered: 08/05/2005)  |
| <input type="checkbox"/> | Online | 08/04/2005 | 11 | Third MOTION for Extension of Time File Response re: 1 MOTION to Quash subpoenas Support by TiVo, Inc.. (Buhay, William) (Entered: 08/04/2005)  |
| <input type="checkbox"/> | Online | 08/04/2005 | 12 | PROPOSED ORDER Granting Six (6) Day Extension re: 11 Third MOTION for Extension Response re: 1 MOTION to Quash subpoenas. (Buhay, William) (Entered: 08/04/2005)  |
| <input type="checkbox"/> | Online | 08/05/2005 | 15 | APPLICATION for Admission of Christine W.S. Byrd Pro Hac Vice by TiVo, Inc.. Filing Fee \$150.00, Receipt #540264. (fmm) (Entered: 08/11/2005)  |
| <input type="checkbox"/> | Online | 08/05/2005 | 16 | APPLICATION for Admission of Perry M. Goldberg Pro Hac Vice by TiVo, Inc.. Filing Fee \$150.00, Receipt #540264. (fmm) (Entered: 08/11/2005)  |
| <input type="checkbox"/> | Online | 08/10/2005 | 14 | Fourth MOTION for Extension of Time File Response re: 1 MOTION to Quash subpoena Support by TiVo, Inc.. (Attachments: # 1)(Buhay, William) (Entered: 08/10/2005)  |
| <input type="checkbox"/> | Runner | 08/12/2005 | -- | ORDER (by docket entry only) granting 15 Application for Admission Pro Hac Vice of Ct Byrd, granting 16 Application for Admission Pro Hac Vice of Perry M. Goldberg. Ordered by Judge William S. Duffey Jr. on 8/12/05. (jdb) (Entered: 08/12/2005)   |
| <input type="checkbox"/> | Online | 08/12/2005 | 17 | ORDER GRANTING 14 Unopposed Motion for Extension of Time to Reply to the Joint Motion re: 8/31/05. Signed by Judge William S. Duffey Jr. on 8/11/05. (kt) (Entered: 08/12/2005)   |
| <input type="checkbox"/> | Online | 08/31/2005 | 18 | Fifth MOTION for Extension of Time re: 1 MOTION to Quash subpoenas with Brief In Support by TiVo, Inc.. (Attachments: # 1 Exhibit A # 2 Proposed Order)(Buhay, William) Modified on 9/1/05 to describe attachments (fmm). (Entered: 08/31/2005)   |
| <input type="checkbox"/> | Online | 09/01/2005 | 19 | ORDER GRANTING 18 Motion for Extension of Time until 9/14/05 for TiVo Inc. to reply to Motion for Protective Order and to Quash Rule 45 Subpoenas. Signed by Judge William S. Duffey Jr. on 8/31/05. (kt) (Entered: 09/01/2005)   |
| <input type="checkbox"/> | Online | 09/14/2005 | 20 | Sixth MOTION for Extension of Time to Reply to Joint Motion for Protective Order and to Quash Subpoenas re: 1 MOTION to Quash subpoenas with Brief In Support by TiVo, Inc.. (Attachments: # 1 Proposed Order)(Buhay, William) Modified on 9/15/2005 to describe attachments (fmm) (Entered: 09/14/2005)  |
| <input type="checkbox"/> | Online | 09/15/2005 | 21 | ORDER GRANTING 20 Unopposed Motion for Extension of Time to Reply to the Joint Motion re: 10/06/05. Signed by Judge William S. Duffey Jr. on 9/15/05. (kt) (Entered: 09/16/2005)  |
| <input type="checkbox"/> | Online | 10/06/2005 | 22 | Seventh MOTION to Continue by TiVo, Inc.. (Attachments: # 1 Exhibit Texas Court's Summary Order# 2 Text of Proposed Order Order Granting Continuance)(Buhay, William) (Entered: 10/06/2005)   |
| <input type="checkbox"/> | Online | 10/07/2005 | 23 | ORDER GRANTING 22 Seventh Unopposed Motion to Extend Time to Reply to EchoStar and Homer Knearl's Joint Motion for a Protective Order and to Quash Rule 45 Subpoenas ui Signed by Judge William S. Duffey Jr. on 10/07/05. (kt) (Entered: 10/07/2005)   |
| <input type="checkbox"/> | Online | 10/07/2005 | 24 | RESPONSE re 22 Seventh MOTION to Continue filed by EchoStar Technologies Corporation Limited Liability Company, EchoStar Communications Corporation, EchoStar DBS Corporation (Schlossberg, Ellen) (Entered: 10/07/2005)  |
| <input type="checkbox"/> | Online | 10/13/2005 | 25 | DOCUMENT FILED IN ERROR Eighth MOTION for Extension of Time to Reply to EchoStar and Homer Knearl's Joint Motion for a Protective Order and to Quash Rule 45 Subpoenas; Motion for Extension of Time as Moot with Brief In Support by TiVo, Inc.. (Attachments: # 1 Exhibit A to 8th motion# 2 Text of Proposed Order# 3 Text of Proposed Order)(Buhay, William) Modified on 10/13/2005. (fmm). (Entered: 10/13/2005) |
| <input type="checkbox"/> | Online | 10/13/2005 | 26 | REDOCKETED #25 MOTION AS Eighth MOTION for Extension of Time by 2 weeks to file Motion for protective order and to Quash subpoenas or MOTION to Dismiss without prejudice Motion for protective order and to Quash subpoenas by TiVo, Inc. (Attachments: # 1 Exhibit B# 3 Proposed Order)(fmm) (Entered: 10/14/2005)  |
| <input type="checkbox"/> | Online | 10/14/2005 | 27 | RESPONSE in Opposition re 26 MOTION to Dismiss MOTION for Extension of Time to file Motion to Quash subpoenas MOTION for Extension of Time to file response to re: 1 Motion to Quash subpoenas filed by Homer Knearl. (Schlossberg, Ellen) (Entered: 10/14/2005)  |

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... 6233189, 886-2-**6233389**. Fax: 886-2- ...
  
- 2. [Journal of Commerce](#), February 1, 1989, Wednesday, EXPORTS, Pg. 4B, 2771 words, WORLD TRADE CENTER NETWORK - TRADE LEADS, World Trade Center NETWORK  
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2. Journal of Commerce, February 1, 1989, Wednesday, EXPORTS, Pg. 4B, 2771 words, WORLD TRADE CENTER NETWORK - TRADE LEADS, World Trade Center NETWORK  
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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 90/007,750  | 10/17/2005  | 6233389              | 454030000041        | 4653             |
| 29989   | 7590        | 12/15/2005           | EXAMINER            |                  |
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**EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM**

REEXAMINATION CONTROL NO 90/007750  
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Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

|  |                    |                                   |  |
|--|--------------------|-----------------------------------|--|
| <b>Order Granting / Denying Request For<br/>Ex Parte Reexamination</b> | <b>Control No.</b> | <b>Patent Under Reexamination</b> |  |
|  | 90/007,750         | 6233389                           |  |
|  | <b>Examiner</b>    | <b>Art Unit</b>                   |  |
|  | DAVID E. HARVEY    | 3992                              |  |

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

The request for *ex parte* reexamination filed 17 October 2005 has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)  PTO-892,      b)  PTO-1449,      c)  Other: \_\_\_\_\_

1.  The request for *ex parte* reexamination is GRANTED.

**RESPONSE TIMES ARE SET AS FOLLOWS:**

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

2.  The request for *ex parte* reexamination is DENIED.

This decision is not appealable (35 U.S.C. 303(c)). Requester may seek review by petition to the Commissioner under 37 CFR 1.181 within ONE MONTH from the mailing date of this communication (37 CFR 1.515(c)). **EXTENSION OF TIME TO FILE SUCH A PETITION UNDER 37 CFR 1.181 ARE AVAILABLE ONLY BY PETITION TO SUSPEND OR WAIVE THE REGULATIONS UNDER 37 CFR 1.183.**

In due course, a refund under 37 CFR 1.26 ( c ) will be made to requester:

- a)  by Treasury check or,
- b)  by credit to Deposit Account No. \_\_\_\_\_, or
- c)  by credit to a credit card account, unless otherwise notified (35 U.S.C. 303(c)).

DAVID E HARVEY  
Primary Examiner  
Art Unit: 3992

cc:Requester ( if third party requester )

DECISION GRANTING EX PARTE REEXAMINATION

1. A substantial new question of patentability affecting claims 1, 6, 20, 21, 23, 32, 37, 51, and 52 of United States Patent Number 6,233,389 is raised by the request for ex parte reexamination. Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that ex parte reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in ex parte reexamination proceedings are provided for in 37 CFR 1.550(c).

2. The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 4,930,158 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

**3. Preface:**

A) On 8/18/2005, the Court issued a "Claim Construction Order" regarding claims 1, 31, 32, and 61 of the instant Patent [SEE: Exhibit 12 of the Request]. It is noted that the claim construction adopted by the PTO should not be narrower than that adopted by the Court given the fact that the PTO constructs claims by giving said claims their "broadest reasonable interpretation" in light of the specification.

B) On 8/25/2005, the Patent owner submitted a "Motion for Partial Summary Judgment" in which the Patent Owner identified those structures of the accused product(s) that allegedly infringed claims 1 and 32 of the instant patent given the "Claim Construction Order" issued by the Court [SEE: Exhibit 13 of the Request].

**4. Issues Raised in the Request:**

A) Pages 16-22 of the Request indicate that the Requester considers claims 1 and 32 to be anticipated by U.S. Patent #5,614,940 to Cobbley et al given the Patent Owner's position as to what falls within the scope of the claim constructions set forth in the Order that was issued by the Court (SEE paragraph 3 above).

B) Pages 26-28 of the Request indicate that the Requester considers claims 6, 20, 21, 23, 37, 51, and 52 to be anticipated by U.S. Patent #5,614,940 to Cobbley et al given the Patent Owner's position as to what falls within the scope of the claim constructions set forth in the Order that was issued by the Court (SEE paragraph 3 above).

C) Pages 22-26 of the Request indicate that the Requester considers claims 1 and 32 to be obvious over U.S. Patent #6,304,714 to Krause et al. and U.S. Patent #5,949,948 to Krause et al. given the Patent Owner's position as to what falls within the scope of the claim constructions set forth in the Order that was issued by the Court (SEE paragraph 3 above).

D) Pages 26-28 of the Request indicate that the Requester considers claims 6, 20, 21, 23, 37, 51, and 52 to be obvious over U.S. Patent #6,304,714 to Krause et al. and U.S. Patent #5,949,948 to Krause et al. given the Patent Owner's position as to what falls within the scope of the claim constructions set forth in the Order that was issued by the Court (SEE paragraph 3 above).

E) Pages 29 of the Request indicate that the Requester considers claims 1, 6, 20, 21, 23, 32, 37, 51, and 52 to be anticipated by, or obvious over, a number of other references including U.S. Patent #6,226,447 to Sasaki et al., U.S. Patent #5,899,578 to Yanagihara, U.S. Patent #6,167,083 to Sporer et al., U.S. Patent #5,577,190 to Peters, and U.S. Patent #6,169,843 to Lenihan et al.

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**5. The Requester takes the position that U.S. Patent #5,614,940 to Cobbley et al anticipates claims 1 and 32 of instant U.S. Patent #6,233,389 to Barton et al for the following reasons:**

A) Claim 1 of the '389 Patent is reproduced below:

1. A process for the simultaneous storage and play back of multimedia data, comprising the steps of:
  - accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC;
  - tuning said TV signals to a specific program;
  - providing at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation;
  - providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components;
  - storing said video and audio components on a storage device;
  - providing at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device;
  - wherein said Output Section assembles said video and audio components into an MPEG stream;
  - wherein said Output Section sends said MPEG stream to a decoder;
  - wherein said decoder converts said MPEG stream into TV output signals;
  - wherein said decoder delivers said TV output signals to a TV receiver; and
  - accepting control commands from a user, wherein said control commands are sent through the system and affect the flow of said MPEG stream.

(Independent claim 32 recites apparatus elements that directly correspond to the steps of claim 1).

B) The Requester takes the position that, under the construction that the Patent Owner advances, Cobbley fully discloses each and every element of claims 1 and 32 of the '389 Patent, as set forth below with respect to claim 1 (The requester contends, however, that this analysis applies to each corresponding element of claim 32 too).

- 1) The first step of claim 1 is "accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not



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limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC." The Requester alleges that the Patent Owner has construed these claim terms to be met by any single broadcast signal, for example, a DBS or cable signal that, in turn, is based upon numerous sub-standards, including closed caption and other audio or video related standards. (See Exhibit 12 of the request at page 8, "DVB format is based on many specifications and has many related standards"). If this interpretation is accepted, then the Requester argues that is met by Cobbley because Cobbley discloses a broadcast receiver 110 that receives broadcast information from broadcast source 105 over transmission medium 107, and because Cobbley further discloses that the broadcast information may be transmitted by a wide variety of broadcast sources, such as "a satellite dish, a radio or television transmitter, etc." (Col. 3, lines 14-20 and 29-42).

2) The next step is "tuning said TV signals to a specific program." The requester alleges that the Patent Owner has construed this step as "adjusting the system to receive signals at a particular frequency or a particular program" (See Exhibit 12 of the Request at page 13), and that the Court has construed it to mean, "tuning said TV signals to a specified frequency range." (See Exhibit 12 of the Request at page 14). If such interpretations are accepted, then the Requester argues that Cobbley fully discloses the step being that it discloses an embodiment with multiple broadcast receivers 110 (See Col. 15, lines 34-40) wherein each of the receivers is tuned to a frequency of a particular broadcast source 105 and its corresponding program.

3) Claim 1 further recites "providing at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation." The Requester alleges that the Patent Owner asserts that this limitation covers situations in which the incoming TV signal is already formatted in MPEG format and is simply demodulated upon receipt, and that the Patent Owner construes the "Input Section" as "hardware and/or code that changes or adapts the form or function of the TV program data to an MPEG format suitable for internal transfer and manipulation." (See Exhibit 12 of the Request at page 14). If this interpretation is accepted, then the Requester contends that Cobbley fully discloses this step because Broadcast Receiver 110 and Capture Device 115 receive broadcasts from satellites in analog form and convert the data to digital form (See Col. 6, lines 32-35), and because Cobbley further discloses that the data can be in MPEG format (See Col. 6, lines 36-54).

4) The next step of claim 1 is "providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components." The Requester alleges that the Patent Owner has defined the term "Media Switch" as "hardware and/or code that connects with [a]

CPU and memory" (See Exhibit 12 of the Request at page 16) and that the Court has construed "Media Switch" to mean "hardware and/or code that mediates between a microprocessor CPU, hard-disk or storage device, and memory" (See Exhibit 12 of the Request at page 18). Further, with respect to the "wherein" limitation of this step, the Requester contends that the Patent Owner construes the term "parses" to mean "analyzes" and the recitation "wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components" as "analyzes an MPEG stream, the MPEG stream having distinguished video and audio components" (See Exhibit 12 of the Request at pages 16-18); i.e. that these claim limitations, as argued by the Patent Owner, do not require actual separation of the data into separate audio and video streams or buffers. If this interpretation is accepted, then the Requester contends that it is fully disclosed by Cobbley as follows:

a. With respect to the term "Media Switch," the Requester argues that:

1. The combination of capture device 115, index data capture device 112 and cache manager 125 forms a "Media Switch" and that cache manager 125 is connected to and interacts with a memory, for example, cache index 128. (Col. 7, line 38-39);
2. That, as illustrated in Figure 1 of Cobbley, cache manager 125 is connected to cache 130, which can be a conventional hard disk (See Col. 7, lines 19-27);
3. That cache manager 125 is also connected to and communicates with a CPU;
4. That Figure 1 illustrates that cache manager 125 is connected to and interacts with a client 140 through network 135;
5. That, as disclosed in Col. 14, lines 14-46 and illustrated in Figure 5, client system 140 includes at least one processor (e.g., 501) (Col. 14, lines 22-29); and

Thus, that Cobbley discloses that cache manager 125 is connected to and communicates with a processor, i.e., the processor of client 140.

b. With respect to the "wherein" limitation, the Requester argues that:

1. Cobbley discloses that the receiving unit can convert incoming data to MPEG format or extract such data if it is already in such a digital format (Col. 6, lines 28-54; Col. 3, lines 14-25 and 30-33);

2. That Cobbley teaches that this system individually analyzes the audio and video components of the audio and video data; and

3. That the index data capture device 115 of the receiving unit can scan "the received audio data utilizing a speech recognition process" or "the received video data utilizing an image recognition process" (Col. 4, lines 41-45; see also Col. 6, lines 16-20); and

Thus, that Cobbley discloses analyzing separately the audio and video components of an MPEG stream to generate indexing information and saving the index information in memory corresponding to those separate components.

5) Claim 1 further recites "storing said video and audio components on a storage device." The Requester alleges that the Patent Owner has construed this term to include systems in which audio and video data remain interleaved and are not stored separately. If the interpretation is accepted, the Requester maintains that it is met by Cobbley being that Cobbley discloses that the distinguished audio and video data and the related index information that corresponds to those distinguished sets of data are stored in cache 130. (See Col. 7, lines 19-27) wherein cache 130 can be a conventional disk drive as discussed above.

6) The next two recitations of claim 1 are "providing at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device" and "wherein said Output Section assembles said video and audio components into an MPEG stream." The Requester alleges that the Patent Owner has construed these steps as "hardware and/or code that takes program data from memory and brings it together as an MPEG stream for play back." (See Exhibit 12 of the Request at page 19). The Requester alleges that, according to the Patent Owner, it is not necessary that separate audio and video streams be retrieved from storage and then assembled back into a single MPEG stream. If such interpretations are accepted, then the Requester contends that Cobbley fully discloses an "Output Section" that extracts video and audio components from a storage device and assembles the components into "an MPEG stream." Specifically, that Cobbley discloses that cache manager 125 can retrieve and output video and audio data from cache 130 in response to a user request for a particular story segment. (Col. 8, lines 6-10; see also Col. 9, lines 58-61); that, as discussed above, Cobbley expressly discloses using MPEG formatted streams. Thus, by retrieving the selected segments and transferring the segments to a client terminal, the Requester argues that cache manager 125 inherently takes data from a memory and produces an MPEG stream for playback (and that, under the Patent Owner's alleged interpretation, there is no need for Cobbley to disclose that it

interleaves the separated audio and video streams back into a single MPEG stream for playback).

7) Claim 1 further recites "wherein said Output Section sends said MPEG stream to a decoder," "wherein said decoder converts said MPEG stream into TV output signals" and "wherein said decoder delivers said TV output signals to a TV receiver." Here, the Requester argues Cobbley discloses that the client system 140, once it receives the selected segments, "decompresses" the selected segments and displays them to the individual user (See Col. 9, lines 61-63) and that, as discussed above, the client system 140 is expressly taught as including a display, such as a television (Col. 3, lines 54-59; Col. 10, lines 7-20).

8) Finally, the last recitation of claim 1 is "accepting control commands from a user, wherein said control commands are sent through the system and affect the flow of said MPEG stream." Here the Requester points out that Figure 2 of Cobbley illustrates buttons, such as pause 230d and scanning rewind 230e, on a user-interface of client terminal 140 (See also Col. 11, lines 35-48).

***It is agreed that consideration of U.S. Patent #5,614,940 to Cobbley et al. raises a substantial new question of patentability as to claims 1 and 32 of Barton et al. [U.S. #6,233,389]. The Cobbley et al. was not cited in the original examination of the Barton et al. patent, and there is a substantial likelihood that a reasonable examiner would consider the teachings therein important in deciding whether or not claims 1 and 32 of Barton et al. [U.S. #6,233,389] are patentable. Accordingly, U.S. Patent #5,614,940 to Cobbley et al. raises a substantial new question of patentability as to claims 1 and 32 of Barton et al. [U.S. #6,233,389], which question has not been decided in a previous examination of the Barton et al. patent.***

**6. The Requester takes the position that U.S. Patent #5,614,940 to Cobbley et al anticipates claims 6, 20, 21, 23, 37, 51, and 52 of instant U.S. Patent #6,233,389 to Barton et al for the following reasons:**

A) The Requester notes that claims 6 and 37 of the '389 Patent are identical in substance and that claim 6 reads as follows:

**6. The process of claim 1, wherein said Media Switch calculates and logically associates a time stamp to said audio and video components.**

That is, the Requester notes, claim 6 depends from claim 1 and recites that the Media Switch calculates and logically associates a time stamp to the audio and video components.

The Requester argues that claim 6 is anticipated by Cobbley (as is claim 37) because, as discussed above, the cache manager 125 correlates the indexing information from index data capture device 112 with the blocks of video and audio data from capture device 115 based on the time stamps provided by each of these devices (See Col. 7, lines 48-65).

B) The Requester notes that claims 20 and 51 of the '389 Patent are identical in substance and that claim 20 reads as follows:

**20. The process of claim 1, wherein said Media Switch operates asynchronously and autonomously with a CPU.**

That is, the Requester notes, Claim 20 depends from claim 1 and recites that the Media Switch operates asynchronously and autonomously with a CPU.

The Requester argues that claim 20 is anticipated by Cobbley (as is claim 51) because the combination of capture device 115, index data capture device 112 and cache manager 125 forms a "Media Switch." Figure I illustrates that these devices are connected to a client 140 through network 135 and, as disclosed in Col. 14, lines 14-46 and illustrated in Figure 5, client system 140 includes at least one processor (e.g., 501). (Col. 14, lines 22-29). Further, the CPU is depicted as operating separately from the "Media Switch" elements in Figure 1.

The Requester further alleges that the same issues are identified in the Cobbley reference and the '389 Patent (see '389 Patent, Col. 2, lines 22-25; Col. 7, lines 20-23), concerning the need for separately operating processes to manage the asynchronous incoming data as soon as it arrives without dependence upon the clocking or operation of the CPU: "In one implementation of the present invention, capture device 115 operates in a pipelined manner to continuously process the received broadcast information. That is, as soon as a block of data is received it is converted to digital form (if necessary), compressed, and transferred to cache manager 125." (Cobbley, Col. 7, lines 1-18); i.e., Cobbley also

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having disclosed the use of an asynchronous bus, for example a 10 Mbps Ethernet network for communications with the CPU and other devices (Col. 6, lines 51-64 and Col. 9, lines 45-50).

C) The Requester notes that claims 21 and 52 of the '389 Patent are identical in substance and that claim 21 reads as follows:

21. The process of claim 1, wherein said storage device is connected to said Media Switch.

That is, the Requester notes, claim 21 depends from claim 1 and recites that the storage device is connected to the Media Switch.

The Requester argues that claim 21 is anticipated by Cobbley (as is claim 52) because Figure 5 illustrates that device 513 is connected through bus 500 to data storage device 500.

D) The Requester notes that claim 23 of the '389 Patent reads as follows:

23. The process of claim 1, wherein said Media Switch is implemented in hardware.

That is, the Requester notes, claim 23 depends from claim 1 and recites that the Media Switch is implemented in hardware.

The Requester argues that claim 23 is anticipated by Cobbley because Cobbley illustrates capture device 115 and cache manager 125 as hardware modules in Figure 1.

***It is agreed that consideration of U.S. Patent #5,614,940 to Cobbley et al. raises a substantial new question of patentability as to claims 6, 20, 21, 23, 37, 51, and 52 of Barton et al. [U.S. #6,233,389]. The Cobbley et al. was not cited in the original examination of the Barton et al. patent, and there is a substantial likelihood that a reasonable examiner would consider the teachings therein important in deciding whether or not claims 6, 20, 21, 23, 37, 51, and 52 of Barton et al. [U.S. #6,233,389] are patentable. Accordingly, U.S. Patent #5,614,940 to Cobbley et al. raises a substantial new question of patentability as to claims 6, 20, 21, 23, 37, 51, and 52 of Barton et al. [U.S. #6,233,389], which question has not been decided in a previous examination of the Barton et al. patent.***

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Page 12

7. **All claims will be reexamined.**
8. **All correspondence relating to this *ex parte* reexamination proceeding should be directed:**

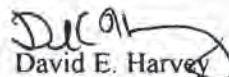
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United States Patent & Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450


By FAX to: (571) 273-9900  
Central Reexamination Unit

By hand: Customer Service Window  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner, or as to the to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

  
David E. Harvey  
Primary Examiner  
(571) 272-7345

  
Conferee

 SPRF 3992 - 12/Dec 05  
Conferee

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| Substitute for form 1448A/B/PTO  |   |    | <b>Complete if Known</b> |                        |              |
| <b>INFORMATION DISCLOSURE STATEMENT</b><br><br>(Use as many sheets as necessary) |   |    | Patent Number            | 6,233,389              |              |
|  |   |    | Issue Date               | May 15, 2001           |              |
|  |   |    | First Named Inventor     | James M. Barton        |              |
|  |   |    | Art Unit                 | Not yet assigned       |              |
|  |   |    | Examiner Name            | Not yet assigned       |              |
| Sheet  | 1 | of | 1                        | Attorney Docket Number | 454030000041 |

| U.S. PATENT DOCUMENTS |                       |  |  |                                |   |   |
|-----------------------|-----------------------|--|--|--------------------------------|---|---|
| Examiner Initials*    | Cite No. <sup>1</sup> | Document Number                          |  | Publication Date<br>MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|                       |                       | Number-Kind Code <sup>2</sup> (if known) |  |                                |   |   |
| <i>DB</i>             | 1.                    | US-5,614,940                             |  | 03-25-1997                     | Cobbley et al.                                  | See Detailed Request  |
| <i>DB</i>             | 2.                    | US-6,304,714                             |  | 10-16-2001                     | Krause et al.                                   | See Detailed Request  |
| <i>DB</i>             | 3.                    | US-5,949,948                             |  | 09-07-1999                     | Krause et al.                                   | See Detailed Request  |
| <i>DB</i>             | 4.                    | US-6,226,447                             |  | 05-01-2001                     | Sasaki et al.                                   | See Detailed Request  |
| <i>DB</i>             | 5.                    | US-5,899,578                             |  | 05-04-1999                     | Yanagihara et al.                               | See Detailed Request  |
| <i>DB</i>             | 6.                    | US-6,167,083                             |  | 12-26-2000                     | Sporer et al.                                   | See Detailed Request  |
| <i>DB</i>             | 7.                    | US-5,577,190                             |  | 11-19-1996                     | Peters  | See Detailed Request  |
| <i>DB</i>             | 8.                    | US-6,169,843                             |  | 01-02-2001                     | Lenihan et al.                                  | See Detailed Request  |

| FOREIGN PATENT DOCUMENTS |                       |   |  |                                |   |   |                |
|--------------------------|-----------------------|---|--|--------------------------------|---|---|----------------|
| Examiner Initials*       | Cite No. <sup>1</sup> | Foreign Patent Document   |  | Publication Date<br>MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T <sup>6</sup> |
|                          |                       | Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known) |  |                                |   |   |                |
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. \* CITE NO.: Those application(s) which are marked with a single asterisk (\*) next to the Cite No. are not supplied (under 37 CFR 1.98(a)(2)(ii)) because that application was filed after June 30, 2003 or is available in the IFW. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 801.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

| NON PATENT LITERATURE DOCUMENTS |                       |   |                |
|---------------------------------|-----------------------|---|----------------|
| Examiner Initials*              | Cite No. <sup>1</sup> | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published. | T <sup>2</sup> |
| <i>DB</i>                       | 9.                    | International Standard ISO/IEC 11172 (MPEG-1 Standard, Part 1: Systems)   |                |
| <i>DB</i>                       | 10.                   | K. Shen et al., <i>A fast algorithm for video parsing using MPEG compressed sequences</i> , IEEE, pp. 252-255 (0-8185-7310-9/959/1995).   |                |
| <i>DB</i>                       | 11.                   | S. Smollar et al., <i>Content-based video indexing and retrieval</i> , IEEE, Summer 1994, pp. 62-72.  |                |
| <i>DB</i>                       | 12.                   | J. Meng et al., <i>CVEPS-A compressed video editing and parsing system</i> , ACM Multimedia '96, Boston MA, pp. 43-53 (ACM 0-89791-671-1/96/1).   |                |
| <i>DB</i>                       | 13.                   | H. Zhang et al., <i>Video parsing, retrieval and browsing: an integrated and content-based solution</i> , ACM Multimedia 95-Electronic Proceedings (Nov. 5-9, 1995, San Francisco, CA).   |                |


\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.


|                    |              |                 |            |
|--------------------|--------------|-----------------|------------|
| Examiner Signature | <i>Dec 9</i> | Date Considered | 12/14/2005 |
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| <b>Application Number</b><br> | <b>Application/Control No.</b><br>90/007,750 | <b>Applicant(s)/Patent under Reexamination</b><br>6233389 |  |
|  | <b>Examiner</b><br>DAVID E. HARVEY           | <b>Art Unit</b><br>3992                                   |  |

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| <b>Reexamination</b><br> | <b>Application/Control No.</b><br>90/007,750 | <b>Applicant(s)/Patent Under Reexamination</b><br>6233389 |
|   | <b>Certificate Date</b>                      | <b>Certificate Number</b>                                 |

|   |
|---|
| <b>Requester</b> <b>Correspondence Address:</b> <input type="checkbox"/> <b>Patent Owner</b> <input checked="" type="checkbox"/> <b>Third Party</b> |
| David L. Fehrman<br>MORRISON & FOERSTER LLP<br>555 W. Fifth Street, Suite 3500<br>Los Angeles, CA 90013   |

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| <b>LITIGATION REVIEW</b> <input checked="" type="checkbox"/>  | DN<br>(examiner initials) | (date)                   |
| <b>Case Name</b>  |                           | <b>Director Initials</b> |
| <i>Tivo Inc. v. Echostar Comm. et al, US District Court Civil Docket US District - TEXAS Eastern (Marshall) 2:04 cv 1</i>                           |                           |                          |
| <i>Tivo Inc. v. Sonisblue Incorporated et al US District Court Civil Docket US District - California Northern (Oakland) 4:02 cv 761</i>             |                           |                          |
| <i>Tivo, Inc. v. Echostar Communications Corporation et al, US District Court Civil Docket US District - Georgia Northern (Atlanta) 1:05 mi 20P</i> |                           |                          |
| <i>Tivo Inc. v. Echostar Communications Corporation et al US District Court Civil Docket US District - Georgia Northern (Atlanta) 1:05 mi 190</i>   |                           |                          |
|   |                           |                          |

| <b>COPENDING OFFICE PROCEEDINGS</b> |               |
|-------------------------------------|---------------|
| <b>TYPE OF PROCEEDING</b>           | <b>NUMBER</b> |
| 1.                                  |               |
| 2.                                  |               |
| 3.                                  |               |
| 4.                                  |               |



Attorney Docket No. 60097-0357

*Reexam  
TC 3992*

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Reexamination of:

|                               |   |                         |
|-------------------------------|---|-------------------------|
| James M. Barton, et al.       | ) | Confirmation No.: 4653  |
|                               | ) |                         |
| Application No.: 90/007,750   | ) | Examiner: NYA           |
|                               | ) |                         |
| Filing Date: October 17, 2005 | ) | Group Art Unit No.: NYA |
|                               | ) |                         |
| Patent No.: 6,233,389         | ) |                         |
|                               | ) |                         |
| Issue Date: May 15, 2001      | ) |                         |

For: MULTIMEDIA TIME WARPING SYSTEM

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a copy of Information Disclosure Citation Form PTO-1449 together with copies of the documents cited on that form, if needed. Pursuant to 37 C.F.R. § 1.97, the submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made and is not to be construed as an admission that the information cited in this statement is material to patentability.

In accordance with the provisions of 37 C.F.R. 1.98, the attention of the Patent and Trademark Office is hereby directed to references listed on the attached form PTO-1449. The references were cited during the prosecution of parent application No. 09/126,071. Therefore, a copy of the references is not provided herewith.

Pursuant to 37 C.F.R. § 1.97, this Information Disclosure Statement is being submitted under one of the following (as indicated by an "X" to the left of the appropriate paragraph):

- 37 C.F.R. §1.97(b). It is respectfully requested that the cited documents be considered and that the enclosed Information Disclosure Citation Form PTO-1449 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).
- 37 C.F.R. §1.97(c). If so, then this Information Disclosure Statement includes one of the following:
- A statement pursuant to 37 C.F.R. §1.97(e)
- 1.97(e)(1) The undersigned hereby states that each item of information contained in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.
- 1.97(e)(2) The undersigned hereby states that no item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in §1.56(c) more than three months prior to the filing of this information disclosure statement.
- A check for \$180.00 for the fee under 37 C.F.R. § 1.17(p).

It is respectfully requested that the cited documents be considered and that the enclosed Information Disclosure Citation Form PTO-1449 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

37 C.F.R. §1.97(d). If so, then this Information Disclosure Statement includes the following:

A statement pursuant to 37 C.F.R. §1.97(e)

1.97(e)(1) The undersigned hereby states that each item of information contained in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement; OR

1.97(e)(2) The undersigned hereby states that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in §1.56(c) more than three months prior to the filing of this information disclosure statement.

AND

A check for \$180.00 for the fee under 37 C.F.R. §1.17(i) for submission of the Information Disclosure Statement.

It is respectfully requested that the cited documents be considered and that the enclosed Information Disclosure Citation Form PTO-1449 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

37 C.F.R. §1.97(i). Applicants are submitting references to satisfy Applicants' disclosure obligations in hopes that the references will be considered by the Examiner. Although the submission does not fully meet 37 C.F.R. §1.97, Applicant respectfully requests that the cited documents be considered and that the enclosed Information Disclosure Citation Form PTO-1449 be initialed by the Examiner to indicate such consideration and a copy thereof returned to Applicant(s). It is understood that if the Examiner does not consider the cited references, the cited documents will be placed in the file pursuant to 37 C.F.R. §1.97(i).

Accordingly, copies of the references as listed on the attached Form PTO 1449 are submitted herewith. No certification or fees are deemed necessary.



The Examiner is hereby notified that the present application is related to the following related application(s):

**DISCLOSURE OF RELATED APPLICATIONS**

| U.S. Application/ Pat. No. | File Date | Atty. Docket. No. |
|----------------------------|-----------|-------------------|
| 09/827,029                 | 4/5/2001  | 60097-0026        |
| 09/935,426                 | 8/22/2001 | 60097-0027        |
| 10/190,256                 | 7/5/2002  | 60097-0028        |
| 10/081,776                 | 2/20/2002 | 60097-0029        |
| 11/051,347                 | 2/4/2005  | 60097-0297        |

The related application(s) may contain subject matter that is related to the subject matter of the present application. The related application(s) may contain one or more claims that may be substantially similar to one or more claims in the present application, and those claims may have been rejected in the related application(s). Therefore, the Examiner is encouraged to review the file history(ies) of the related application(s) as some of the information contained therein may be material to the examination of the present application.



The Examiner is hereby notified that for the following related application(s) an Office Action has been received as indicated below:

**DISCLOSURE OF OFFICE ACTIONS**

| U.S. Application/ Pat. No. | File Date | Office Action Mailing Date | Atty. Docket. No. |
|----------------------------|-----------|----------------------------|-------------------|
| 10/081,776                 | 2/20/2002 | 5/20/05                    | 60097-0029        |
| 10/081,776                 | 2/20/2002 | 11/5/04                    | 60097-0029        |
| 10/081,776                 | 2/20/2002 | 6/29/04                    | 60097-0029        |
| 10/081,776                 | 2/20/2002 | 9/29/03                    | 60097-0029        |
| 10/081,776                 | 2/20/2002 | 4/4/03                     | 60097-0029        |
| 10/081,776                 | 2/20/2002 | 10/23/02                   | 60097-0029        |
| 09/827,029                 | 4/5/2001  | 11/17/03                   | 60097-0026        |
| 09/827,029                 | 4/5/2001  | 6/10/06                    | 60097-0026        |


The related application(s) may contain one or more claims that may be substantially similar to one or more claims in the present application, and those claims may have been rejected in the related application(s). Therefore, the Examiner is encouraged to review the file history(ies) of the related application(s) as some of the information contained therein may be material to the examination of the present application.

Throughout the pendency of this application, please charge any additional fees, including any required extension of time fees, and credit all overpayments to deposit account 50-1302.

Respectfully submitted,

HICKMAN PALERMO TRUONG & BECKER LLP

Dated: February 15, 2006

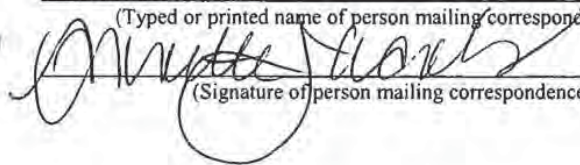
  
\_\_\_\_\_  
Kirk D. Wong  
Reg. No. 43, 284

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\_\_\_\_\_  
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on February 15, 2006.  
(Date of Deposit)

Annette Jacobs

(Typed or printed name of person mailing correspondence)

  
\_\_\_\_\_  
(Signature of person mailing correspondence)

|  |  |                                      |
|--|--|--------------------------------------|
| <b>INFORMATION DISCLOSURE CITATION<br/>IN AN APPLICATION<br/><br/>(PTO-1449)</b> | <b>ATTY. DOCKET NO.</b><br>60097-0357        | <b>APPLICATION NO.</b><br>90/007,750 |
|  | <b>APPLICANT:</b><br>James M. Barton, et al. |                                      |
|  | <b>FILING DATE:</b><br>October 17, 2005      | <b>GROUP:</b><br>NYA                 |

**U.S. PATENT DOCUMENTS**

| Exam. Initial* | Cite No. <sup>1</sup> | U.S. Patent Document |                                      | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document<br>MM-DD-YYYY | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|----------------|-----------------------|----------------------|--------------------------------------|---|---|---|
|                |                       | Number               | Kind Code <sup>2</sup><br>(If known) |   |   |   |
|                |                       | 3,682,363            |                                      | Hull  | 8/8/72  |   |
|                |                       | 3,942,190            |                                      | Detweiler                                       | 3/2/76  |   |
|                |                       | 4,141,039            |                                      | Yamamoto  | 2/20/79   |   |
|                |                       | 4,224,481            |                                      | Russell   | 9/23/80   |   |
|                |                       | 4,258,418            |                                      | Heath   | 3/24/81   |   |
|                |                       | 4,313,135            |                                      | Cooper  | 7/28/80   |   |
|                |                       | 4,347,527            |                                      | Lainez  | 8/31/82   |   |
|                |                       | 4,388,659            |                                      | Lemke   | 6/14/83   |   |
|                |                       | 4,408,309            |                                      | Kiesling et al.                                 | 10/4/83   |   |
|                |                       | 4,423,480            |                                      | Bauer et al.                                    | 12/27/83  |   |
|                |                       | 4,439,785            |                                      | Leonard   | 3/27/84   |   |
|                |                       | 4,506,348            |                                      | Miller et al.                                   | 3/19/85   |   |
|                |                       | 4,506,358            |                                      | Montgomery                                      | 3/19/85   |   |
|                |                       | 4,602,297            |                                      | Reese   | 7/22/86   |   |
|                |                       | 4,633,331            |                                      | McGrady et al.                                  | 12/30/86  |   |
|                |                       | 4,665,431            |                                      | Cooper  | 8/16/82   |   |
|                |                       | 4,688,106            |                                      | Keller et al.                                   | 8/18/87   |   |
|                |                       | 4,689,022            |                                      | Peers et al.                                    | 8/25/87   |   |
|                |                       | 4,706,121            |                                      | Young   | 11/10/87  |   |
|                |                       | 4,752,834            |                                      | Koombes   | 9/21/88   |   |
|                |                       | 4,723,181            |                                      | Hickok  | 2/2/88  |   |
|                |                       | 4,755,889            |                                      | Schwartz  | 7/5/88  |   |
|                |                       | 4,760,442            |                                      | O'Connell et al.                                | 7/26/98   |   |
|                |                       | 4,761,684            |                                      | Clark et al.                                    | 8/2/98  |   |
|                |                       | 4,789,961            |                                      | Tindall   | 12/6/98   |   |
|                |                       | 4,805,217            |                                      | Morihiro et al.                                 | 2/14/89   |   |
|                |                       | 4,816,905            |                                      | Tweedy et al.                                   | 3/28/89   |   |
|                |                       | 4,821,121            |                                      | Beaulier  | 4/11/89   |   |
|                |                       | 4,833,710            |                                      | Hirashima                                       | 5/23/89   |   |
|                |                       | 4,876,670            |                                      | Nakabayashi et al.                              | 10/24/89  |   |
|                |                       | 4,891,715            |                                      | Levy  | 1/2/90  |   |

|                    |  |                 |  |
|--------------------|--|-----------------|--|
| Examiner Signature |  | Date Considered |  |
|--------------------|--|-----------------|--|

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



|   |           |  |                                   |
|---|-----------|--|-----------------------------------|
| Substitute for Form 1449A/PTO (Modified)<br>(use as many sheets as necessary) |           | Attorney Docket No.:<br>60097-0357               | Application Number:<br>90/007,750 |
|   |           | First Named Inventor:<br>James M. Barton, et al. |                                   |
|   |           | Filing Date:<br>October 17, 2005                 |                                   |
|   | 4,897,867 | Foster et al.                                    | 9/30/90                           |
|   | 4,920,533 | Dufresne et al.                                  | 4/24/90                           |
|   | 4,924,387 | Jeppesen   | 5/8/90                            |
|   | 4,949,187 | Cohen  | 8/14/90                           |
|   | 4,963,866 | Duncan   | 10/16/90                          |
|   | 4,963,995 | Lang   | 10/16/90                          |
|   | 4,972,396 | Rafner   | 11/20/90                          |
|   | 4,979,050 | Westland et al.                                  | 12/18/90                          |
|   | 4,991,033 | Takeshita  | 2/5/91                            |
|   | 5,001,568 | Efron et al.                                     | 3/19/91                           |
|   | 5,014,125 | Pocock et al.                                    | 5/7/91                            |
|   | 5,018,186 | Kimura et al.                                    | 5/21/91                           |
|   | 5,019,900 | Clark et al.                                     | 5/28/91                           |
|   | 5,021,893 | Scheffler  | 6/4/91                            |
|   | 5,027,241 | Hatch et al..                                    | 6/25/91                           |
|   | 5,027,400 | Baji et al.                                      | 6/25/92                           |
|   | 5,047,857 | Duffield et al.                                  | 9/10/91                           |
|   | 5,057,932 | Lang   | 10/15/91                          |
|   | 5,063,453 | Yoshimura et al.                                 | 11/5/91                           |
|   | 5,089,885 | Clark  | 2/18/92                           |
|   | 5,093,718 | Hoarty et al.                                    | 9/28/90                           |
|   | 5,109,281 | Koberi et al.                                    | 4/28/92                           |
|   | 5,118,105 | Brim et al.                                      | 6/2/92                            |
|   | 5,126,852 | Nishino et al.                                   | 6/30/92                           |
|   | 5,126,982 | Yifrach  | 6/30/92                           |
|   | 5,130,792 | Tindell et al.                                   | 7/14/92                           |
|   | 5,132,992 | Yurt   | 7/21/92                           |
|   | 5,134,499 | Sata et al.                                      | 7/28/92                           |
|   | 5,142,532 | Adams  | 8/25/92                           |
|   | 5,153,726 | Billing  | 10/6/92                           |
|   | 5,168,353 | Walker et al.                                    | 12/1/92                           |
|   | 5,172,413 | Bradley et al.                                   | 12/15/92                          |
|   | 5,202,761 | Cooper   | 5/28/91                           |
|   | 5,208,665 | McCalley et al.                                  | 5/4/93                            |
|   | 5,214,768 | Martin et al.                                    | 5/25/93                           |
|   | 5,226,141 | Esbensen   | 7/6/93                            |
|   | 5,233,423 | Jernigan et al.                                  | 8/3/93                            |

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|-----------------------|--|-----------------|--|
| Examiner<br>Signature |  | Date Considered |  |
|-----------------------|--|-----------------|--|

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|   |           |  |          |                                   |  |
|---|-----------|--|----------|-----------------------------------|--|
| Substitute for Form 1449A/PTO (Modified)<br>(use as many sheets as necessary) |           | Attorney Docket No.:<br>60097-0357               |          | Applicati n Number:<br>90/007,750 |  |
|   |           | First Named Inventor:<br>James M. Barton, et al. |          |                                   |  |
|   |           | Filing Date:<br>October 17, 2005                 |          |                                   |  |
|   | 5,233,603 | Tekeuchi   | 8/3/93   |                                   |  |
|   | 5,237,648 | Mills et al.                                     | 8/17/93  |                                   |  |
|   | 5,241,428 | Goldwasser et al.                                | 8/31/93  |                                   |  |
|   | 5,245,430 | Nishimura  | 9/14/93  |                                   |  |
|   | 5,247,347 | Litteral et al.                                  | 9/21/93  |                                   |  |
|   | 5,251,009 | Bruno  | 10/5/93  |                                   |  |
|   | 5,253,275 | Yurt et al.                                      | 10/12/93 |                                   |  |
|   | 5,283,659 | Akiyama et al.                                   | 2/1/94   |                                   |  |
|   | 5,285,272 | Bradley et al.                                   | 2/8/94   |                                   |  |
|   | 5,287,182 | Haskell et al.                                   | 2/15/94  |                                   |  |
|   | 5,311,423 | Clark  | 5/10/94  |                                   |  |
|   | 5,317,603 | Osterweil  | 5/31/94  |                                   |  |
|   | 5,317,604 | Osterweil  | 5/31/94  |                                   |  |
|   | 5,329,320 | Yifrach  | 7/12/94  |                                   |  |
|   | 5,361,261 | Edem et al.                                      | 11/1/94  |                                   |  |
|   | 5,357,276 | Banker et al.                                    | 10/18/94 |                                   |  |
|   | 5,371,551 | Logan et al.                                     | 12/6/94  |                                   |  |
|   | 5,412,416 | Nemirofsky                                       | 5/2/95   |                                   |  |
|   | 5,414,455 | Hooper et al.                                    | 5/9/95   |                                   |  |
|   | 5,428,731 | Powers   | 6/27/95  |                                   |  |
|   | 5,438,423 | Lynch et al.                                     | 8/1/95   |                                   |  |
|   | 5,440,334 | Walters et al.                                   | 8/8/95   |                                   |  |
|   | 5,442,390 | Hooper et al.                                    | 8/15/95  |                                   |  |
|   | 5,477,263 | O'Callaghan                                      | 12/19/95 |                                   |  |
|   | 5,481,542 | Logston et al.                                   | 1/2/96   |                                   |  |
|   | 5,488,409 | Yuen et al.                                      | 1/30/96  |                                   |  |
|   | 5,506,615 | Awaji  | 4/9/96   |                                   |  |
|   | 5,508,940 | Rossmere et al.                                  | 4/16/96  |                                   |  |
|   | 5,513,011 | Matsumoto  | 4/30/96  |                                   |  |
|   | 5,513,306 | Mills et al.                                     | 4/30/96  |                                   |  |
|   | 5,519,684 | Iizuka et al.                                    | 5/21/96  |                                   |  |
|   | 5,528,281 | Grady et al.                                     | 6/18/96  |                                   |  |
|   | 5,528,282 | Voeten et al.                                    | 6/18/96  |                                   |  |
|   | 5,550,594 | Cooper et al.                                    | 7/26/93  |                                   |  |
|   | 5,550,982 | Long et al.                                      | 8/27/96  |                                   |  |
|   | 5,555,463 | Staron   | 12/10/96 |                                   |  |
|   | 5,559,999 | Maturi   | 9/24/96  |                                   |  |
|   | 5,572,261 | Cooper   | 6/7/95   |                                   |  |

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|-----------------------|--|-----------------|--|
| Examiner<br>Signature |  | Date Considered |  |
|-----------------------|--|-----------------|--|

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|--|---|--|
| <b>Substitute for Form 1449A/PTO (Modified)</b><br>(use as many sheets as necessary) | <b>Attorney Docket No.:</b><br>60097-0357               | <b>Application Number:</b><br>90/007,750 |
|  | <b>First Named Inventor:</b><br>James M. Barton, et al. |  |
|  | <b>Filing Date:</b><br>October 17, 2005                 |  |

**U.S. PATENT DOCUMENTS**

| Exam. Initial* | Cite No. <sup>1</sup> | U.S. Patent Document |                                      | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document<br>MM-DD-YYYY | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|----------------|-----------------------|----------------------|--------------------------------------|---|---|---|
|                |                       | Number               | Kind Code <sup>2</sup><br>(If known) |   |   |   |
|                |                       | 5,581,479            |                                      | McLaughlin et al.                               | 12/3/96   |   |
|                |                       | 5,583,561            |                                      | Baker et al.                                    | 8/10/96   |   |
|                |                       | 5,586,264            |                                      | Belknap et al.                                  | 12/17/96  |   |
|                |                       | 5,619,247            |                                      | Russo   | 4/8/97  |   |
|                |                       | 5,625,464            |                                      | Compoint et al.                                 | 4/29/97   |   |
|                |                       | 5,629,732            |                                      | Moskowitz et al.                                | 5/13/97   |   |
|                |                       | 5,635,984            |                                      | Lee   | 9/3/97  |   |
|                |                       | 5,659,539            |                                      | Porter  | 8/19/97   |   |
|                |                       | 5,675,388            |                                      | Cooper  | 12/28/93  |   |
|                |                       | 5,696,866            |                                      | Iggulden et al.                                 | 12/9/97   |   |
|                |                       | 5,696,868            |                                      | Kim et al.                                      | 8/19/96   |   |
|                |                       | 5,701,383            |                                      | Russo   | 12/23/97  |   |
|                |                       | 5,706,388            |                                      | Isaka   | 12/30/96  |   |
|                |                       | 5,715,356            |                                      | Hirayama et al.                                 | 2/3/98  |   |
|                |                       | 5,721,815            |                                      | Ottesen et al.                                  | 2/24/98   |   |
|                |                       | 5,721,878            |                                      | Ottensen et al.                                 | 2/24/98   |   |
|                |                       | 5,724,474            |                                      | Oguro et al.                                    | 3/3/98  |   |
|                |                       | 5,751,282            |                                      | Girard et al.                                   | 5/12/98   |   |
|                |                       | 5,751,338            |                                      | Ludwig et al.                                   | 5/12/98   |   |
|                |                       | 5,751,371            |                                      | Shintani  | 5/12/98   |   |
|                |                       | 5,751,883            |                                      | Ottensen et al.                                 | 5/12/98   |   |
|                |                       | 5,754,254            |                                      | Kobayashi et al.                                | 5-1998  |   |
|                |                       | 5,761,417            |                                      | Henley et al.                                   | 6/2/98  |   |
|                |                       | 5,771,334            |                                      | Yamauchi et al.                                 | 6/23/98   |   |
|                |                       | 5,774,170            |                                      | Hite et al.                                     | 6/30/98   |   |
|                |                       | 5,774,186            |                                      | Brodsky et al.                                  | 6/30/98   |   |
|                |                       | 5,778,137            |                                      | Nielsen et al.                                  | 7/7/98  |   |
|                |                       | 5,805,763            |                                      | Lawler et al.                                   | 9/8/98  |   |
|                |                       | 5,815,689            |                                      | Shaw  | 9/29/98   |   |
|                |                       | 5,822,493            |                                      | Uehara et al.                                   | 10/13/98  |   |
|                |                       | 5,852,705            |                                      | Hanko et al.                                    | 12/22/98  |   |

|                    |  |                 |  |
|--------------------|--|-----------------|--|
| Examiner Signature |  | Date Considered |  |
|--------------------|--|-----------------|--|

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| Substitute for Form 1449A/PTO (Modified)<br>(use as many sheets as necessary) | Attorney Docket No.:<br>60097-0357               | Application Number: |
|   | First Named Inventor:<br>James M. Barton, et al. |                     |
| Filing Date:<br>October 17, 2005  |  |                     |

**U.S. PATENT DOCUMENTS**

| Exam. Initial* | Cite No. <sup>1</sup> | U.S. Patent Document |                                      | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document<br>MM-DD-YYYY | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
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|  |  |              | <b>First Named Inventor:</b><br>James M. Barton, et al. |  |          |
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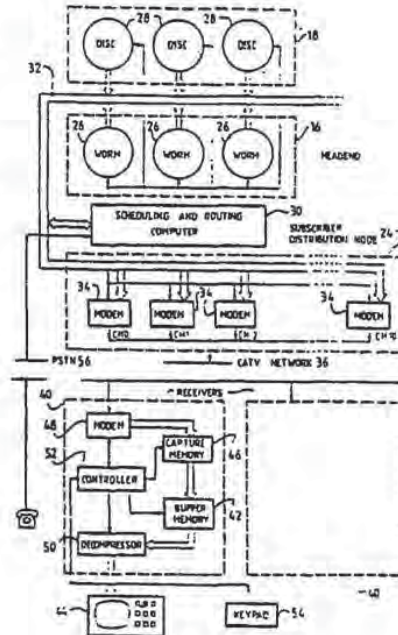
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| <p>(51) International Patent Classification 5 :<br/>H04H 1/00, H04N 7/167<br/>G11B 27/36</p>   | <p>A1</p>   | <p>(11) International Publication Number: <b>WO 91/03112</b><br/>(43) International Publication Date: 7 March 1991 (07.03.91)</p> |
| <p>(21) International Application Number: PCT/AU90/00370<br/>(22) International Filing Date: 23 August 1990 (23.08.90)<br/>(30) Priority data:<br/>PJ 5933 23 August 1989 (23.08.89) AU<br/>(71) Applicant (for all designated States except US): DELTA BETA PTY LTD [AU/AU]; 20 Mews Road, Fremantle, W.A. 6160 (AU).<br/>(72) Inventor; and<br/>(75) Inventor/Applicant (for US only) : DE BEY, Henry, Curtis [US/AU]; 349 Marmion Street, Cottesloe, W.A. 6011 (AU).<br/>(74) Agent: VAN WOLLINGEN, Rolf; Griffith Hack &amp; Co., 256 Adelaide Terrace, Perth, W.A. 6000 (AU).</p> | <p>(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CM (OAPI patent), DE*, DE (European patent)*, DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.<br/><br/>Published<br/>With international search report.</p> |   |

(54) Title: PROGRAM TRANSMISSION OPTIMISATION

(57) Abstract

A system and method of optimising transmission of a program to multiple users over a distribution system, with particular application to video-on-demand for a CATV network (36). The system includes, at a head end of the CATV network (36) a scheduling and routing computer (30) for dividing the video program stored in long term fast storage (16) or short term fast storage (18) into a plurality of program segments, and a subscriber distribution node (24) for transmitting the program segments in a redundant sequence in accordance with a scheduling algorithm. At a receiver (40) of the CATV network (36) there is provided a buffer memory (42) for storing the transmitted video program segments for subsequent playback whereby, in use, the scheduling algorithm can ensure that a user's receiver (40) will receive all of the program segments in a manner that will enable continuous playback in real time of the program. Under the control of controller (52) the receiver (40) distinguishes received program segments by a segment identifier so that redundant segments captured in capture memory (46) are then stored in buffer memory (42) from which the segments can be retrieved and decompressed in data decompressor (50) for immediate or subsequent viewing.



\* See back of page

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PROGRAM TRANSMISSION OPTIMISATIONFIELD OF THE INVENTION

The present invention relates to a system and method for program transmission optimisation over a distribution system and relates particularly, though not exclusively, to such a method and system for supplying video-on-demand over a cable television network.

DISCUSSION OF THE PRIOR ART

Throughout the following specification the word "program" should be understood in the broadest sense of the term and includes any information, whether visual or audible, a mixture of both or otherwise, which is normally perceived in a substantially continuous sequence of impressions through one or more of the human senses. The term "video program" refers to a program of visual information or visual and audible information, whether recorded in reproducible format or transmitted "live". In our "information society", with its increasing emphasis on greater accessibility to information, there are many situations where the same program may be required to be accessed by more than one person at the same time.

Thus, for example, in a library of a large educational institution which stores lectures and other information on audio and/or video cassettes, the demand for certain programs may be particularly high at certain times and there is a need to be able to allow several students to listen to or view the program simultaneously from the beginning, without having to force individuals to start listening to or viewing the program at the same time. Ideally, it should be possible to service the needs of all persons requiring that program immediately when it is requested. In practice this is extremely difficult without expensive duplication of equipment and complex electronic processing. Another example of this type of multiple user situation is so called video-on-demand television. A video-on-demand system ideally allows any subscriber to request (demand) any particular video program at

- 2 -

any time of the day.

A prior art video-on-demand system is described in U.S. 4,506,387 to Walter in which each video program is pre-programmed in a memory device selectable by a host computer at  
5 a central data station in response to an address signal transmitted from the user. The host computer controls the transmission of the video program at a high non-real-time rate over a fibre optic line network to a data receiving station at the users location. The data receiving station then converts  
10 the received optical data to electrical data and stores it for subsequent real-time transmission to the users television set.

There are a number of significant disadvantages with the system of Walter, the foremost being that it is incompatible with existing television transmission networks,  
15 and in particular CATV coaxial cable networks. In order to achieve a rapid response time Walter transmits all of the digital data corresponding to an entire program to the receiving station over a plurality of fibre optic lines within a very short time. Even with compression of the digital data  
20 the bandwidth requirement for this system is relatively large. For example, sixteen (16) optical data channels over four fibre optic lines are required to transmit a two hour movie in about thirty one seconds. Very few homes or buildings currently have ready access to a fibre optic cable, and a fibre optic network  
25 is expensive to install.

A further disadvantage with the system of Walter is that it cannot adequately handle a high demand for the same video program. Research in video tape lending libraries indicates that out of a total of say five thousand tapes held  
30 in the library, at any one time only a core group of twenty to forty most popular titles are in high demand. Furthermore, this research into the viewing habits of viewers indicates that the core video demand requirement varies throughout the day as the nature of the viewers changes. Whilst Walter contemplates  
35 that the central data station may transmit only a portion of the selected program to the user for his viewing, and then begin transmitting a portion of another selected program to a second user, the system cannot simultaneously handle several

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users requesting the same program. In that event, a user must wait until transmission of the entire program to each user who placed a request prior to his own has been completed, before the system can attend to his demand. Clearly with core video programs this could result in unacceptable delays.

#### SUMMARY OF THE INVENTION

The present invention was developed with a view to providing a method and system for program transmission optimisation over a distribution system for multiple users, and was developed specifically, though not exclusively, with a view to providing a system and method for supplying video-on-demand which is compatible with existing video distribution systems such as CATV. Throughout this specification the term "distribution system" is to be construed in the broadest sense of the term and covers ordinary radio and television networks, CATV and internal television/video/audio distribution systems of the kind employed in hotels, educational institutions and more recently in aircraft and ocean liners.

According to one aspect of the present invention there is provided a method for optimising transmission of a program to multiple users over a distribution system, the method comprising:

at a head end of the distribution system,

dividing the program into a plurality of program segments; and,

transmitting the program segments in a redundant sequence in accordance with a scheduling algorithm;

and at a receiver of the distribution system,

storing the transmitted program segments in a buffer storage means in the receiver for subsequent playback whereby, in use, said scheduling algorithm can ensure that a user's receiver will receive all of the program segments in a manner that will enable continuous playback in real time of the program.

Preferably the method further comprises selecting a Maximum Response Time (MRT) corresponding to a maximum time a user need wait to commence playing a requested program.

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Typically the step of dividing the program involves dividing the program into segments of a length selected such that at least one segment can be transmitted in the time of one MRT.

5           In the preferred embodiment said step of transmitting the segments involves transmitting one or more segments during each MRT, including a first segment corresponding to a first segment of playing time of the program, in accordance with the scheduling algorithm whereby, in use, the first segment is  
10 always available at a receiver within one MRT for immediate playback.

          According to another aspect of the present invention there is provided a system for optimising transmission of a program to multiple users, the system comprising:  
15 at a head end of the system:

          means for dividing the program into a plurality of program segments; and,  
          means for transmitting the program segments in a redundant sequence in accordance with a scheduling  
20 algorithm;

and at a receiver of the system,  
          buffer storage means for storing the transmitted program segments for subsequent playback on the receiver whereby, in use, said scheduling algorithm  
25 can ensure that the receiver will receive all of the program segments in a manner that will enable continuous playback in real time of the program at the receiver.

          Preferably the system further comprises at the head  
30 end of the system:

          means for numbering the program segments 1 to n, where n equals the number of segments into which the program is divided, and wherein the segments are numbered in the order in which they should appear in  
35 the program for normal playback.

          According to a further aspect of the present invention there is provided a receiver for receiving a program supplied by a program transmission optimisation system, the

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receiver comprising:

buffer storage means for storing a plurality of program segments of the program transmitted from a head end of the system according to a scheduling algorithm; and,

5 processing means for processing said program segments stored in the buffer storage means and supplying the segments in the correct sequence for playback whereby, in use, said scheduling algorithm can ensure that the receiver will receive all of the program segments in a manner that will enable  
10 continuous playback in real time of the program at the receiver.

Typically said processing means comprises means for distinguishing received program segments by a segment identifier, wherein said segment identifier at least identifies  
15 a segment by its number whereby, in use, the receiver can distinguish redundant segments from segments required for subsequent playback.

According to a still further aspect of the present invention there is provided a scheduling apparatus for a  
20 program transmission optimisation system, the apparatus comprising:

means for dividing the program into a plurality of program segments;

25 means for scheduling said plurality of program segments in a redundant sequence in accordance with a scheduling algorithm; and,

means for routing said scheduled program segments for transmission to one or more receivers of users requesting the program whereby, in use, said scheduling algorithm can ensure  
30 that a user's receiver will receive all of the program segments in a manner that will enable continuous playback in real time of the program.

Preferably said means for dividing divides the program into segments of a length selected such that at least  
35 one segment can be transmitted in a Maximum Response Time (MRT) time interval, wherein MRT corresponds to a maximum time a user need wait to commence playing a requested program from its beginning.



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The scheduling algorithm preferably employed in the invention involves iteratively calculating during each MRT the result of COUNT Modulo  $X = Y$ , wherein COUNT = a predetermined initial whole number incremented by 1 each MRT,  $X=1$  to  $n$ , where  
5  $n$  = the number of segments into which the program has been divided, whereby, in use, wherever  $Y=0$  the program segment number  $X$  will be transmitted.

#### BRIEF DESCRIPTION OF DRAWINGS

In order to facilitate a better understanding of the  
10 nature of the invention a detailed description of one preferred embodiment of a program transmission optimisation system and method in the form of a video-on-demand system and method will now be given, by way of example only, with reference to the accompanying drawings, in which:

15 Figure 1 is a schematic diagram of a preferred embodiment of a video-on-demand system;

Figure 2 is a more detailed block diagram illustrating the functional blocks of the video-on-demand system in Figure 1 applied to a CATV network;

20 Figure 3 is a flow chart of the method steps employed at a head end of the video-on-demand system;

Figure 4 is a flow chart of the method steps employed at a receiver of the video-on-demand system;

\* Figure 5 is a tabular representation of the  
25 transmission sequence of video segments in accordance with a preferred scheduling algorithm; and,

Figure 6 is a graphical representation of the relationship between Maximum Response Time and the required video-hours/hour of transmission time.

#### 30 DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Figure 1 illustrates schematically a preferred embodiment of the video-on-demand system according to the present invention. Referring to Figure 1, external non-compressed material can enter the system in its most basic  
35 format such as 35mm film, video tape, or through a tel communications link such as broadcast television or

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satellite transmission. The non-compressed material is passed through a media compression system 10 for compressing the audio visual program material into a compressed format. The audio visual program material may be compressed by an external video  
5 compression service provider, such as Intel Corporation. Such external compressed material may enter the system directly via a storage distribution node 12. The storage distribution node 12 routes the compressed video material to the appropriate storage medium.

10 There are three types of storage in the system, long term slow storage 14, long term fast storage 16 and short term fast storage 18. The division of the storage of compressed video material into the different types of storage is based on commercial considerations, in view of the relatively high cost  
15 of fast storage media compared to slow storage media. The selection of the type of storage to which different programs would be routed is based upon the expected future demand for the video material concerned. Daily news segments would probably be stored in short term fast storage 16, whereas a  
20 movie classic such as "Gone With The Wind" would probably be stored in long term fast storage 16. Infrequently requested materials such as some obscure silent movie would probably be stored in long term slow storage 14. The storage distribution node 12 is typically a micro or mini computer which controls  
25 the flow of data between the different storage devices.

The long term slow storage 14 typically takes the form of storage media such as magnetic tapes, or optical discs and may require human intervention for retrieval of infrequently accessed program material. The long term fast  
30 storage 16 may typically take the form of a jukebox type of optical disc storage device. Optical disc storage provides high density storage with random access, and the jukebox access mechanism provides automatic program access. A typical unit currently available is the KODAK Optical Disc System 6800  
35 drive/cabinet. The short term fast storage 18 may take the form of a magnetic disc drive such as an IBM Model 3380. This allows rapid random access to the compressed video material stored in digital format, but is a relatively expensive storage

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medium and would therefore only be used for storing popular core video programs.

The scheduling and routing computer 20 receives requests for specific audio visual material from user's receivers 22A, 22B or 22C via a bi-directional request and distribution network. The scheduling and routing computer 20 controls the retrieval and division of the selected video program in a plurality of video segments, schedules the video segments in accordance with a scheduling algorithm and controls the routing of the scheduled segments for transmission to one or more of the receivers 22A, 22B or 22C, so that each requesting viewer's receiver will receive all of the video segments in a manner that will enable continuous immediate viewing of the program. The video-on-demand system employs a combination of frequency multiplexing and time division multiplexing. The time division multiplexing of the video segments is controlled by the scheduling and routing computer 20 in accordance with the scheduling algorithm. The frequency multiplexing is performed by a subscriber distribution node 24 under the control of the scheduling and routing computer 20. The processing capabilities of the scheduling and routing computer 20 are similar to that required by computers used by banks for automatic teller machines. The scheduling and routing computer 20 may be any suitable computer with a typical processing capability of 1.5 to 200 million instructions per second (MIPS), depending on the size of the subscriber base and other loading factors.

The viewer's receivers 22 are typically frequency agile, to be compatible with the frequency multiplexing employed at the head end of the system. The receivers are provided with processing means to capture the appropriate data packets created by the time division multiplexing of the video segments. The receivers 22 are also provided with buffer storage means for storing the received video segments, and would typically also comprise decompression means for decompressing the video data for subsequent display on a dedicated television screen, or fed into a conventional television set.

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The video-on-demand system of Figure 1 can operate on either analog or digital communication circuits, however in the preferred embodiment described below the video distribution system is a conventional cable television system which is analog. In the preferred embodiment of the system described below primarily modulated digital data is transmitted over the CATV network. However, it is envisaged that a future system will employ a mixture of analog and modulated digital signals.

The method of program transmission optimisation according to the invention can provide transmission optimisation for either digital or analog information signals.

Conventional CATV systems are typically simplex communication systems (one way only) so that there is no easy way to retransmit data when errors are detected. Accordingly, some form of error compensation is required. Fortunately, television data is generally used in a very transient manner, unlike computer data that must be assured of accurate transmission. If a few frames of a TV image are disturbed most viewers accept this without even a conscious acknowledgment of their occurrence. Accordingly, a much higher bit error rate can be tolerated, for example 1 erroneous data bit per 100,000. At this rate the human eye/brain system normally cannot even detect the video effects caused by this erroneous bit. Most digital modems work with bit error rates of 1 in 100,000,000 to 1 in 1,000,000,000! Therefore, the video-on-demand system can tolerate error rates typically from 1,000 to 10,000 times higher than most computer data systems are presently designed for. A higher error rate will of course improve performance, although the improvement may be imperceptible to a viewer.

Figure 2 illustrates in block diagram form a preferred embodiment of the video-on-demand system applied to a CATV network. The video demand system comprises at the head end means for providing a video program in a compressed format in the form of Write Once Read Many (WORM) storage devices and magnetic disc storage devices providing long term fast storage and short term fast storage respectively. In this particular embodiment the compressed video material is stored in digital format in the storage devices and the video

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programs may already be segmented in the storage media in video packets sized to be compatible with the system specifications. The magnetic disc devices 28 and WORM devices 26 are connected to a scheduling and routing computer 30 by data bus 32.

5           The scheduling and routing computer 30 responds to a subscriber request for a particular program by retrieving the video program from the appropriate storage media and dividing the video program into a plurality of video segments. As mentioned above, the video program may be stored in the storage  
10 media already in segments corresponding to the scheduling requirements of the system thereby reducing the load on the computer 30 during the process of retrieving and dividing the video program into video segments. The computer 30 then schedules the plurality of video segments of the video program  
15 in accordance with a scheduling algorithm, as will be described in more detail below, and routes the scheduled video segments for transmission to one or more receivers of viewers requesting the video program. For core video programs (those that are in continuous demand by at least one subscriber for periods of  
20 more than one Video Playing Time (VPT)), the scheduling algorithm can be run once and the packets stored in the scheduled sequence on a serial recording device such as a tape drive (not shown), to further reduce loading on the computer.

In this embodiment the subscriber distribution node  
25 24 comprises a plurality of modems 34 under the control of the scheduling and routing computer 30. Each modem 34 modulates a different carrier frequency signal, corresponding to each of the channels on the CATV network 36, for transmitting the video segment data packets routed to the appropriate modem 34 by the  
30 scheduling and routing computer 30 over data bus 32.

Each subscriber on the CATV network 36 is provided with a receiver 40 for receiving the video segment data packets corresponding to the requested program and storing the video segments for future viewing by the subscriber. Each receiver  
35 40 typically comprises a buffer memory 42 for storing the video segments of the video program transmitted from the head end, and video processing means for processing the video segments stored in the buffer memory and supplying the segments in the

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correct sequence to a subscriber television set 44 for viewing. Typically the video processing means may include a controller 52 and a capture memory 46 for capturing the video segment data packets received over the CATV network 36 and demodulated by one or more modems 48 of the receiver. Under the control of controller 52 the video processing means distinguishes received program segments by a segment identifier, for example the PKT ID, so that redundant segments can be ignored and overwritten in capture memory 46. Modem 48 is preferably a frequency agile broad band modem such as the Fairchild M505, although as noted above a more low level digital modem with lower bit error rate can also be employed. Compressed video data packets captured in capture memory 46 are stored in buffer memory 42 from which the segments can be retrieved and decompressed in data decompressor 50 for immediate or subsequent viewing. The microprocessor based controller 52 controls the flow of data and the video processing within the receiver 40.

Some CATV systems can accommodate bidirectional decoders or receivers, and for this type of system the receiver 40 is provided with a key pad 54 to enable the subscriber to initiate a request via the CATV network 36. However, the majority of CATV systems are unidirectional (simplex) and a subscriber request must therefore be made over the public switched telephone network (PSTN) 56. The subscriber request via the PSTN 56 may be verbal or via touch tone keying similar to that provided by other on-line subscriber network service providers.

Security on the system to prevent unauthorised viewing of transmitted programs may be implemented in several ways. Standard encryption algorithms could be applied at the modems 34 prior to transmission. Each receiver 40 would then require a key to decrypt the received data. Encryption/decryption keys are distributed to subscribers in a similar manner to that employed by financial institutions to distribute PINs for automatic teller machine usage. Alternatively, each data packet transmitted at the head end can be prefixed with a receiver ID unique to each subscriber so that a pirate receiver would need to select the appropriate receiver ID in

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order to receive a particular video program.

It will be appreciated that the video-on-demand system illustrated in Figure 2 is exemplary only, and that many other hardware implementations could be employed to effect the method and system for supplying video-on-demand according to the invention. For example, the receivers 40 may comprise several modems for simultaneously receiving data packets over several channels, and the capture memory may be dispensed with if the video segments are stored in the buffer memory in compressed format. The video segments are then decompressed when they are provided to the subscriber's television set in the correct sequence for viewing. Furthermore, certain sections of the head end apparatus or of the receiver may be located at different geographical locations. For example, in view of the typical architecture of CATV systems, it is possible that the modem and buffer sections of the receiver will become part of the cable network in what is referred to as a subscriber tap, and that the other sections would be located at the subscriber's premises.

It should be noted that the video segment data packets for a particular program need not be transmitted over the same channel for all viewing subscribers. By employing a combination of time division multiplexing and multiple channels at the head end of the system, data rates over each of the channels can be kept at a minimum therefore allowing the use of less expensive hardware at the receivers. Each receiver 40 may be configured to scan the channels in a cyclic fashion in order to determine which channel or channels the appropriate video segments are being transmitted. In addition to this a dedicated control channel can be provided over which data from the scheduling and routing computer 30 is transmitted to instruct each receiver as to which packets to receive and on which channel(s). However, preferably the head end transmits the video segments in accordance with the scheduling algorithm in a continuous manner, with each video segment provided with a title ID as well as a segment ID, so that each receiver will receive all of the video segments with the appropriate title ID and can discard or overwrite the video segments already

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received.

A key feature of the present invention is the scheduling of the video segments for transmission in a redundant sequence in a manner that will ensure that each receiver will receive all of the video segments for the requested program according to a schedule that will enable continuous playback in real time of the video program at the receiver. A preferred form of an efficient scheduling algorithm and its implementation will now be described in detail.

In the following description the term "Maximum Response Time" (MRT) refers to the maximum time a subscriber will need to wait before the video program requested will be available for viewing at his receiver. MRT refers to the maximum time that the system has to respond to the demand. Video Play Time (VPT) refers to the time required to play the particular video program when viewed at normal play back speed. The data that comprises the video program must be divided into video segment data packets of such a length that one packet can be transmitted in the time of 1 MRT. The video segment play back time or slot length of one data packet need not be less than 1 MRT and may be longer than 1 MRT depending on how much band width is available over the transmission medium for transmitting the data packet(s) in the time of 1 MRT. The slot length may be variable in order to adjust the instantaneous loading and data rates on the transmission medium or to adjust the amount of buffer storage space required in the receivers. However, in any one installation, the slot length and MRT would normally be fixed for a specific system configuration. In the following description the slot length has been made equal to the MRT in order to simplify explanation. Thus, for example, if the video program is 60 minutes long and the MRT is 5 minutes, the video program is divided into 12 discreet data packets each corresponding to 5 minutes of video segment data. Each of the data packets is numbered from 1 to n where n equals VPT/MRT, in chronological viewing order.

Implementation of the scheduling algorithm is preferably under software controlled by the scheduling and



routing computer 30. The basic flow of the scheduling program is as follows:

```

    set MRT equal to chosen maximum response time
    set a counter equal to 0 an initial value
5   retrieve video segment data packets sized to relate
    to a play time of MRT (PKT1, PKT2 ....PKTn).
loop wait for remainder of period equal to MRT
    set COUNT equal to COUNT plus 1
    if (COUNT Modulo 1) = 0 then transmit PKT1
10  if (COUNT Modulo 2) = 0 then transmit PKT2
    if (COUNT Modulo 3) = 0 then transmit PKT3
    .....
    .....
    .....
15  if (COUNT Modulo n) = 0 then transmit PKTn
    start again at loop

```

Note: (x Modulo y) = the remainder of (x divided by y).

In accordance with the above scheduling algorithm video segment data packets are transmitted in a redundant sequence, with one or more data packets being transmitted during each MRT. Each transmission starts at an incremental time n\*MRT, and in many instances a majority of the MRT period is expended in actually accomplishing the transmissions. With the above scheduling algorithm PKT1 will always be transmitted, however the other packets may or may not be transmitted at any given value for COUNT. Hence, any particular requesting receiver may receive the packets in a non-contiguous stream. Thus, for an MRT = 5 and a VPT = 60 it may receive the packets as follows:

| MRT | PKTs Received                    | PKTs Viewed |
|-----|----------------------------------|-------------|
| 1   | PKT1 AND PKT3                    | PKT1 VIEWED |
| 2   | PKT2                             | PKT2 VIEWED |
| 3   | PKT4 AND PKT8 AND PKT12          | PKT3 VIEWED |
| 4   | NO PACKETS                       | PKT4 VIEWED |
| 5   | PKT5 AND PKT6 AND PKT7 AND PKT11 | PKT5 VIEWED |
| 6   | NO PACKETS                       | PKT6 VIEWED |
| 7   | NO PACKETS                       | PKT7 VIEWED |
| 8   | PKT9 AND PKT10                   | PKT8 VIEWED |

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|    |              |
|----|--------------|
| 9  | PKT9 VIEWED  |
| 10 | PKT10 VIEWED |
| 11 | PKT11 VIEWED |
| 12 | PKT12 VIEWED |

5           The above sequence is just one of many possible packet delivery sequences produced by the algorithm. Figure 6 is a graphical representation of the sequence of video segment data packets transmitted during each MRT time interval. The number of each video segment appears on the vertical axis and the number of the MRT interval appears along the horizontal axis. Figure 6 shows a maximum of 30 video segments and 49 MRT intervals, however obviously these are arbitrary numbers and both axes could be continued indefinitely. There would be a practical limit to the number of video segments that the video program could be divided into, however the number of MRT intervals will be a function of the duration for which a particular program is in continuous demand. From casual observance of the sequence output of the algorithm it would appear to be a random ordering of packets. However, although the sequence may be considered pseudo-random, it is in fact non-random in that it ensures that a receiver never has to wait on any packet to be transmitted and can provide immediate viewing of the video segments in the correct sequence. Accordingly, by the time the receiver is ready to display a particular packet, that packet will either be in the buffer memory, or being received at that time.

20           In the above table, redundant packets have not been included in the "PKTs received" column since in practice these would be discarded or overwritten by the receiver. In the above sequence example it will be noted that within a time equal to 8 MRTs all 12 packets have been received, and that certain packets, for example PKT12, is received by the receiver well before it is needed for viewing. PKT12 and any other packets received early are held in the buffer until the appropriate time for viewing. The scheduling algorithm ensures that a packet is always received when it is due to be viewed or before.

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In Figure 6, it can be seen that at certain times, for example, MRT intervals 12, 24 and 36 a larger number of packets are received than at other times, which tends to increase the load on the transmission medium and the buffer memory in the receivers. It is preferable that the buffer memory be large enough to store all of the data packets for a particular program, and this also enables the receiver to store the program for later viewing if desired.

The underlying design considerations for the scheduling algorithm and the amount of buffer memory required in the receivers involve trade off's between the response time (MRT) guaranteed to viewers, the bandwidth required for servicing requests, and the amount of buffer storage space provided in the receivers. The principle advantage of a scheduling algorithm of the above kind is the efficient utilisation of the transmitting medium that can be realised. Thus, for example, if an MRT of 5 minutes is required, without the scheduling algorithm the complete video program would need to be transmitted continuously from the beginning every 5 minutes. Thus, for a program with 60 minutes play time the complete program would have to be transmitted 12 times. Using the above scheduling algorithm the number of data packets required to be transmitted to provide an MRT of 5 minutes is equal to having to transmit the entire program only 3.12 times.

The relationship between MRT and the total amount of data that must be transmitted can be represented by the following "best fit curve" equation:

$$\text{TOTAL DATA} = \frac{\text{LOG (MRT/154.94)}}{- 0.47782}$$

Total data is in terms of VPT, so that a data amount of 3 is equal to 3 times the VPT or 180 minutes worth of data for a 60 minute program supplied with an MRT of 5 minutes. Figure 6 is a graphical representation of the relationship between MRT and the required video-hours/hour of transmission time or the total amount of data transmitted.

It will be appreciated that although the above described scheduling algorithm is the preferred form, modifications can be made to the algorithm that would allow

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trade off's between transmission efficiency and the amount of buffer storage required. Commercial considerations will determine how the balance of system costs are weighted. If more is spent on receiver buffers, then less will be required to be spent on provision of transmission lines.

In an example of a modified scheduling algorithm it is possible to diverge from the requirement of always sending PKT1. In this case, PKT1 and other selected packets may be transmitted less frequently and held in available buffer storage space at the receivers until a request is lodged. For example, the following implementation can be adopted:

Each receiver is provided with low power buffer memory devices which are kept active at all times for receiving selected packets of video programs. Assuming there are, say, 10 core video programs, the receivers can be configured to store PKT1 of each of the 10 core video programs, PKT1 being only transmitted at predetermined intervals in accordance with the modified scheduling algorithm, rather than at each MRT as in the above described scheduling algorithm. Hence, when a request for a core program is lodged, the first packet is already in the receiver buffer memory and can be immediately accessed for viewing while the modified scheduling algorithm is then implemented. This can reduce transmission bandwidth requirements considerably, with a modest increase in receiver cost, while providing instantaneous delivery of the core program to the viewer.

It is also possible to reduce peak transmission loads by diverging from the requirement that all requests start to be serviced within a maximum period equal to MRT. By accepting a small percentage of service delays, it is possible to further smooth the transmission load.

A typical software control sequence at both the head end computer and at the receiver will now be described with reference to Figures 3 and 4. When the head end scheduling and routing computer receives a subscriber request it records the subscriber ID, the requested program title, ID and the time of request. The computer tracks each request and its progress towards completion in accordance with the scheduling algorithm.

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There will normally be several program streams being transmitted at any one time. The scheduling algorithm generates different data rates at different times as noted above. By staggering the entry value of COUNT for different program streams, the total data rate on the transmission medium can be maintained at a fairly constant level. Depending upon the value of COUNT at which a particular request enters the algorithm, the time taken to complete transmission of a requested program may range from 1 MRT to 1 VPT or any value in between.

Hence, when the head end computer has recorded the subscriber ID, title ID and time of request it determines whether the requested program is currently active, and if so enters the scheduling sequence at the conclusion of the current MRT time interval. If the requested program is not currently active then the COUNT value of the computer's internal counter, (may be a software counter) is set to the appropriate initial value to provide a staggering of the entry value of COUNT for each different program stream. Thus, for example, assuming requests are made simultaneously for programs A, B, C and D, service of the four requests can all commence simultaneously. However, program A would enter the algorithm scheduling sequence with COUNT equal to zero, B with COUNT equal to 1, C with COUNT equal to 2 and D with COUNT equal to 3. Thus, during each MRT time interval different numbers of video segments for each of the programs would be transmitted simultaneously, rather than the same number of video segments for each respective program.

At the commencement of the next MRT interval the computer enters the scheduling algorithm program sequence noted above and schedules the data packets for the title requested as per the scheduling algorithm. The computer also appends the title ID and packet ID to each data packet. The computer then selects a free channel and routes the data packets to the corresponding modem for transmission to the requesting receivers. The head end computer follows this sequence of steps until all of the packets for the requested title have been transmitted since the time of the last request for this

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title. As soon as the computer has determined that all pending requests have been satisfied, no further data packets for that program are transmitted.

At the receiver, after the subscriber has sent a request the receiver scans the transmission channels and looks for the title ID. When the receiver finds the title ID it looks for the packet ID and stores any packets not already received in the buffer storage. If a packet has already been received this packet is discarded and the receiver continues to look for the remaining data packets until all the data packets for the video program have been received. Data packets stored in the buffer storage may be sent to the receiver directly for immediate viewing or stored for later viewing. Although not illustrated in Figure 4, the receiver may also be configured to look for its unique address ID to provide a degree of security against unauthorised data reception.

From the above description of a preferred embodiment of the program transmission optimisation comprising a system and method of supplying video-on-demand it will be apparent that the scheduling algorithm employed provides an efficient means of transmitting a program to multiple requesting subscribers who can commence playback of the program within a specified maximum response time. It will be apparent to those skilled in the electronics, television and telecommunication arts that numerous modifications and alterations may be made to the program transmission optimisation system and method, other than those already described, without departing from the basic inventive concepts. For example, in alternative realisations of the system and method an optical fibre network may be employed for the distribution system, for example, to provide programming on demand for aircraft passengers. Furthermore, the system and method can operate using analog communications as well as digital, or a mixture of both. Although in the video-on-demand system described the video program segments are transmitted in compressed format, this is obviously not an essential feature of the invention, since significant improvements in transmission efficiency can be achieved by relying upon the scheduling algorithm alone. All

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such modifications and alterations are to be considered within the scope of the present invention the nature of which is to be determined from the foregoing description and the appended claims.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method for optimising transmission of a program to multiple users over a distribution system, the method comprising:
  - 5 at a head end of the distribution system, dividing the program into a plurality of program segments; and, transmitting the program segments in a redundant sequence in accordance with a scheduling algorithm;
  - 10 and at a receiver of the distribution system, storing the transmitted program segments in a buffer storage means in the receiver for subsequent playback whereby, in use, said scheduling algorithm can ensure that a user's receiver will receive all
  - 15 of the program segments in a manner that will enable continuous playback in real time of the program.
2. A method as claimed in claim 1, further comprising the step of selecting a Maximum Response Time (MRT) corresponding to a maximum time a user need wait to commence
- 20 playing a requested program from its beginning.
3. A method as claimed in claim 2, wherein said step of dividing the program involves dividing the program into segments of a length selected such that at least one segment can be transmitted in the time of one MRT.
- 25 4. A method as claimed in claim 3, wherein said step of transmitting involves transmitting one or more segments during each MRT, including a first segment corresponding to a first segment of playing time of the program, in accordance with the scheduling algorithm whereby, in use, the first segment is
- 30 always available at a receiver within one MRT for immediate viewing.
5. A method as claimed in claim 4, further comprising at the head end of the distribution system the step of



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numbering the program segments 1 to n, where n equals the number of segments into which the program is divided, and wherein the segments are numbered in the order in which they should appear in the program for normal playback.

- 5 6. A method as claimed in claim 5, wherein the scheduling algorithm involves iteratively calculating during each MRT the result of:

$$\text{COUNT} \text{ Modulo } X = Y,$$

wherein COUNT = a predetermined initial whole number

- 10 incremented by 1 after each MRT;

X = 1 to n, where n = the number of segments into which the program has been divided;

whereby, in use, whenever  $Y=0$ , the program segment number X will be transmitted.

- 15 7. A method as claimed in claim 1, further comprising the steps of recording a user identification number, a program title identification number and a time of each request in a subscriber request map; and, tracking each request and its progress towards completion.

- 20 8. A system for optimising transmission of a program to multiple users, the system comprising:

at a head end of the system:

means for dividing the program into a plurality of program segments; and,

- 25 means for transmitting the program segments in a redundant sequence in accordance with a scheduling algorithm;

and at a receiver of the system,

buffer storage means for storing the transmitted program segments for subsequent playback on the receiver whereby, in use, said scheduling algorithm can ensure that the receiver will receive all of the program segments in a manner that will enable continuous playback in real time of the program at

- 30  
35 the receiver.

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9. A system as claimed in claim 8, further comprising at the head end of the system:

means for numbering the program segments 1 to n, where n equals the number of segments into which the program  
5 is divided, and wherein the segments are numbered in the order in which they should appear in the program for normal playback.

10. A system as claimed in claim 9, further comprising at the head end of the system:

means for appending a segment identifier to each  
10 program segment prior to transmitting, wherein said segment identifier at least identifies a program segment by its number.

11. A system as claimed in claim 8 or 9, wherein said means for transmitting transmits one or more of said program segments during each Maximum Response Time (MRT) time interval,  
15 wherein MRT corresponds to a maximum time a user need wait to commence playing a requested program.

12. A system as claimed in claim 11, further comprising at the head end of the system:

means for iteratively calculating during each MRT the  
20 result of the scheduling algorithm:

$$\text{COUNT Modulo } X = Y,$$

wherein COUNT = a predetermined initial whole number incremented by 1 after each MRT;

X = 1 to n, where n = the number of segments into  
25 which the program has been divided;

whereby, in use, whenever  $Y=0$ , the program segment number X will be transmitted.

13. A receiver for receiving a program supplied by a program transmission optimisation system, the receiver  
30 comprising:

buffer storage means for storing a plurality of program segments of the program transmitted from a head end of the system according to a scheduling algorithm; and,

processing means for processing said program segments

- 24 -

stored in the buffer storage means and supplying the segments in the correct sequence for playback whereby, in use, said scheduling algorithm can ensure that the receiver will receive all of the program segments in a manner that will enable  
5 continuous playback in real time of the program at the receiver.

14. A receiver as claimed in claim 13, where said processing means comprises means for distinguishing received program segments by a segment identifier, wherein said segment  
10 identifier at least identifies a segment by its number whereby, in use, the receiver can distinguish redundant segments from segments required for subsequent playback.

15. A receiver as claimed in claim 13 or 14, wherein said processing means further comprises decompressing means for decompressing compressed program segments transmitted from the head end of the program transmission optimisation system.

16. A scheduling apparatus for a program transmission optimisation system, the apparatus comprising:  
means for dividing the program into a plurality of  
20 program segments;  
means for scheduling said plurality of program  
segments in a redundant sequence in accordance with a scheduling algorithm; and,  
means for routing said scheduled program segments for  
25 transmission to one or more receivers of users requesting the program whereby, in use, said scheduling algorithm can ensure that a user's receiver will receive all of the program segments in a manner that will enable continuous playback in real time of the program.

30 17. A scheduling apparatus as claimed in claim 16, wherein said means for dividing divides the program into segments of a length selected such that at least one segment can be transmitted in a Maximum Response Time (MRT) time interval, wherein MRT corresponds to a maximum time a user need

- 25 -

wait to commence playing a requested program from its beginning.

18. A scheduling apparatus claimed in claim 17, further comprising means for numbering the program segments 1 to n, 5 where n equals the number of segments into which the program is divided, and wherein the segments are numbered in the order in which they should appear in the program for normal playback.

19. A scheduling apparatus as claimed in claim 18, further comprising means for iteratively calculating during 10 each MRT the result of the scheduling algorithm:

$$\text{COUNT Modulo } X = Y,$$

wherein COUNT = a predetermined initial whole number incremented by 1 after each MRT;

15  $X = 1$  to  $n$ , where  $n$  = the number of segments into which the program has been divided; whereby, in use, whenever  $Y=0$ , the program segment number  $X$  will be transmitted.

20. An apparatus as claimed in claim 16, wherein said means for dividing retrieves the program segments from a 20 compressed program storage means wherein the program is stored in segmented format corresponding to said plurality of segments.

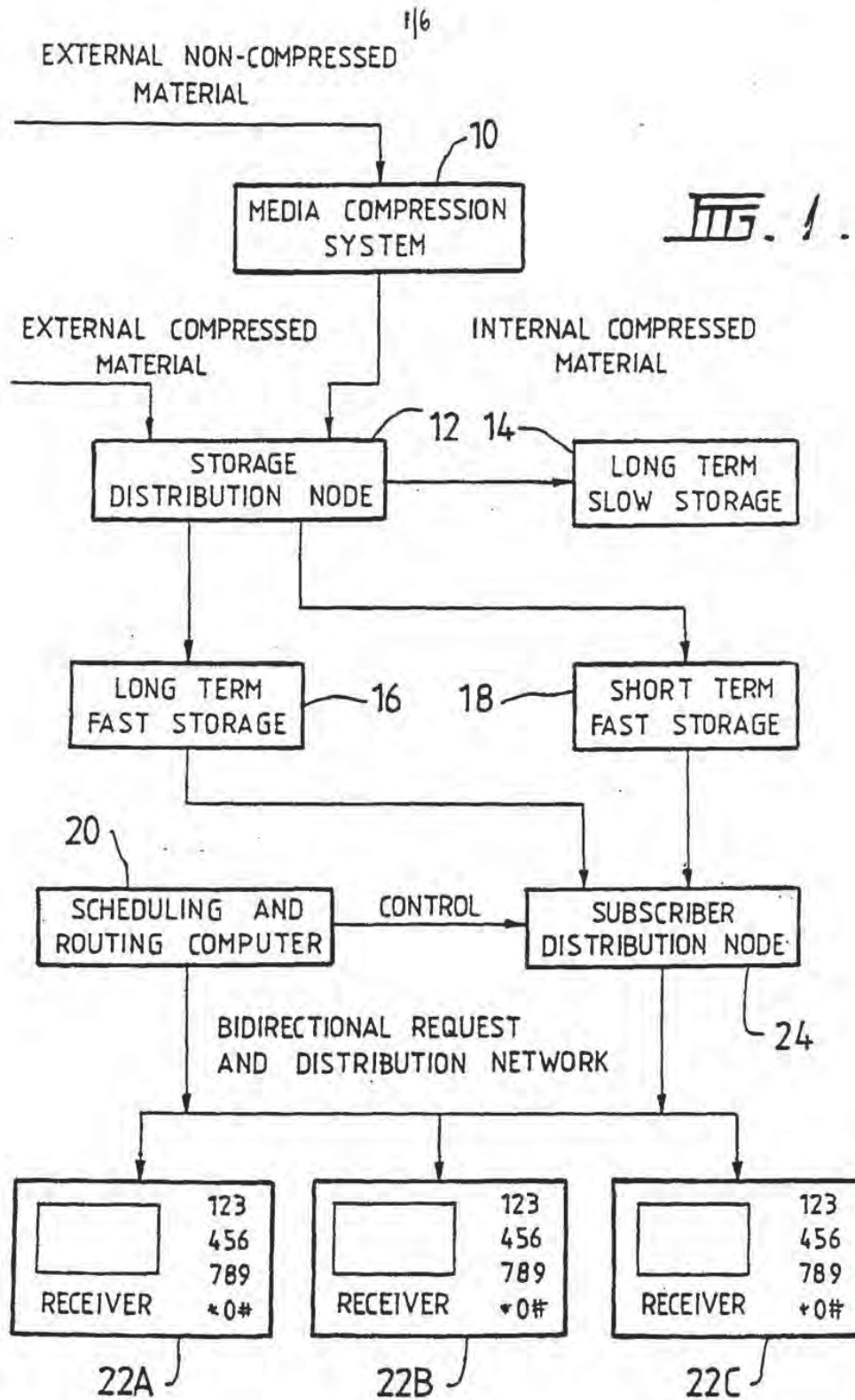


FIG. 1

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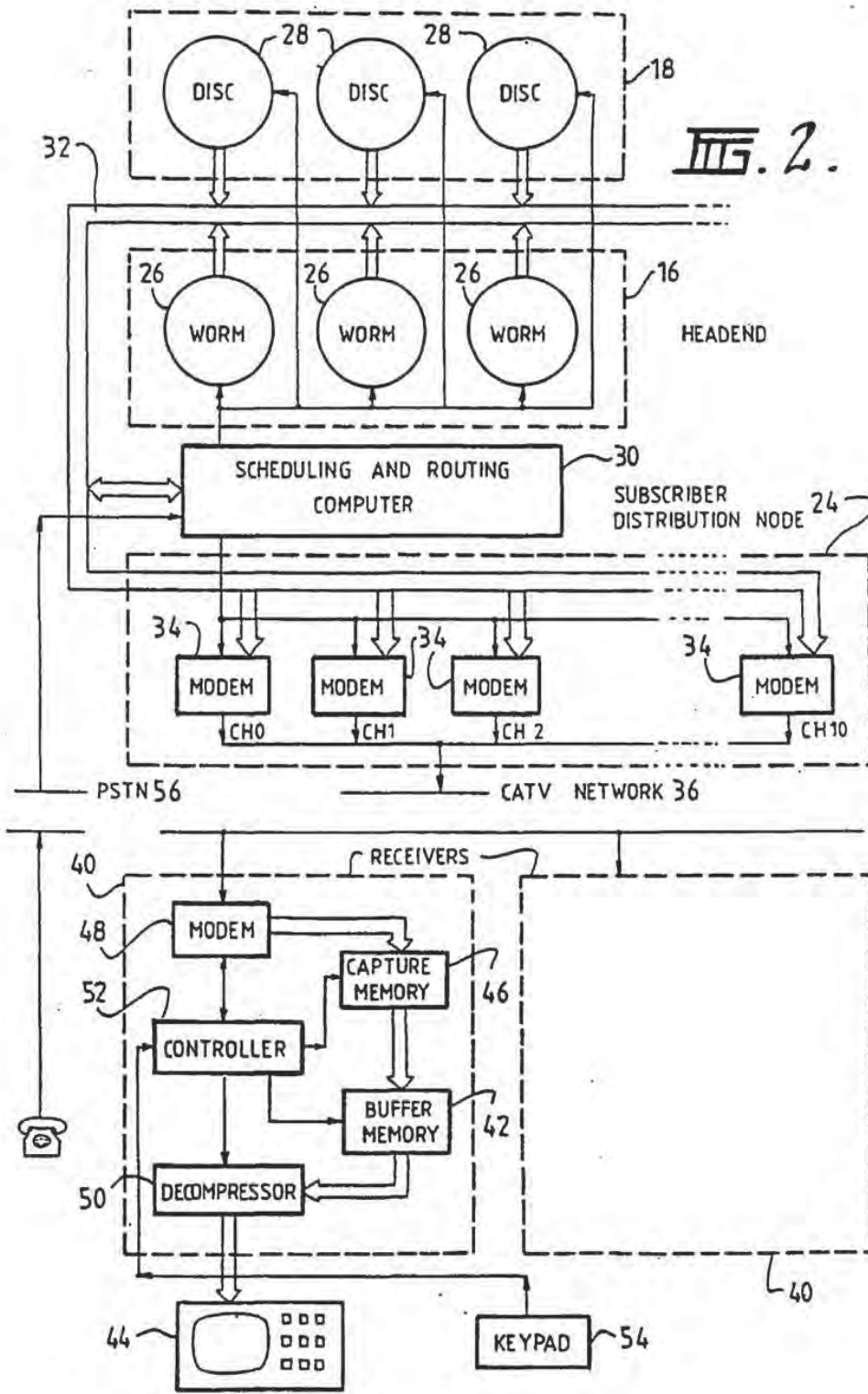


FIG. 2.

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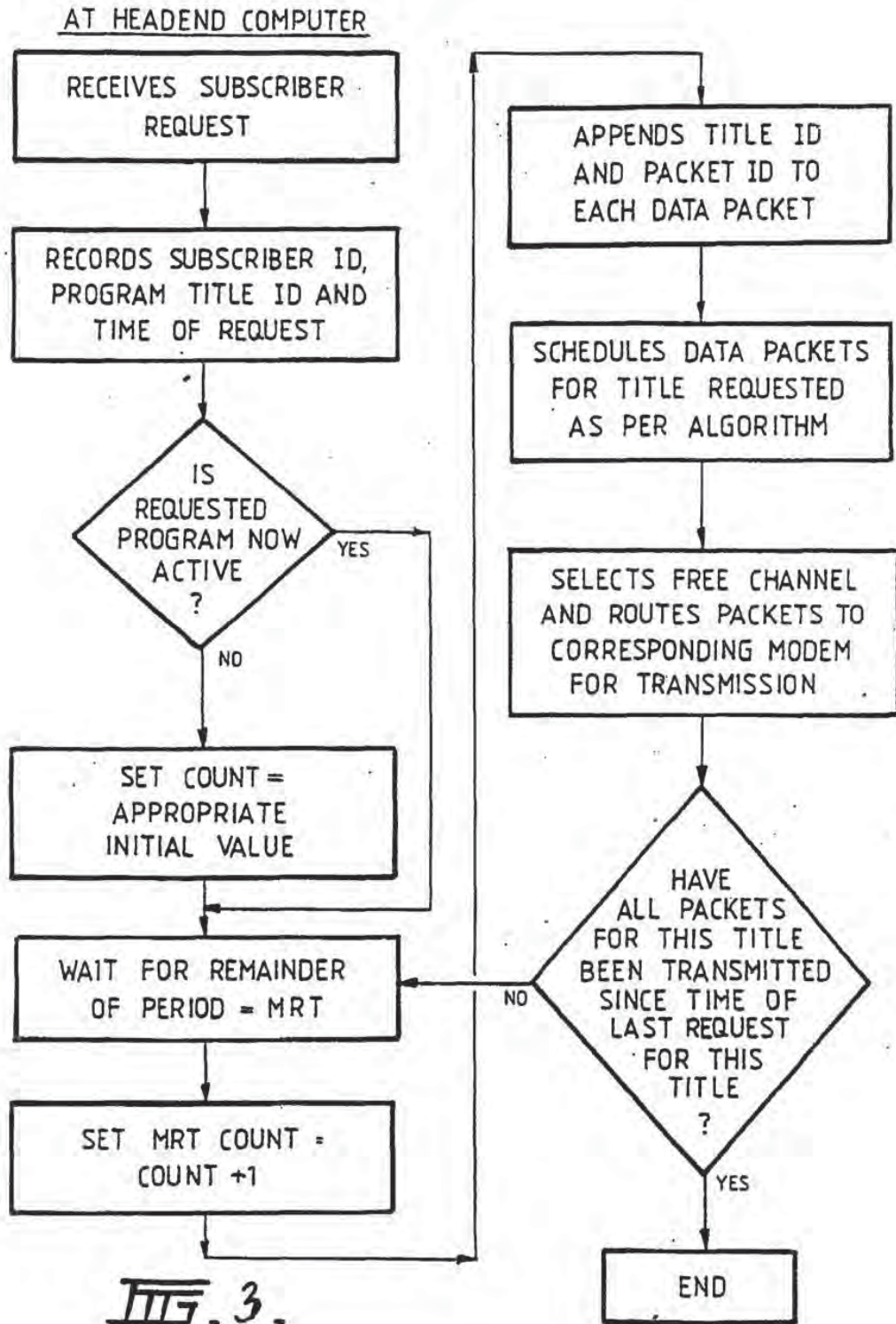


FIG. 3.

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AT RECEIVER

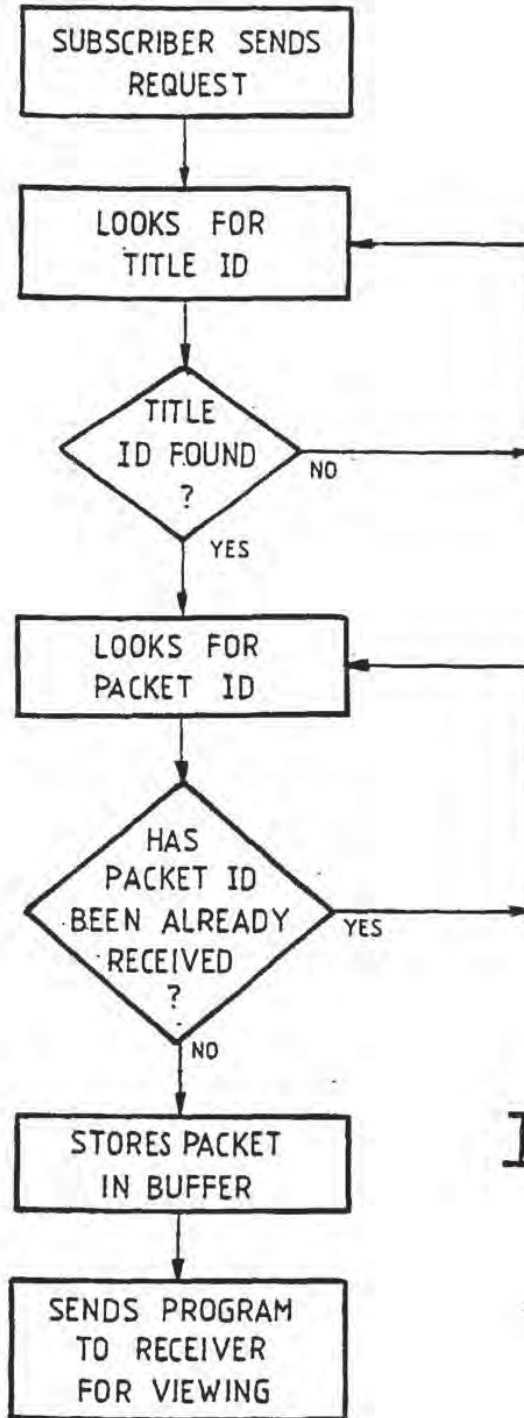


FIG. 4.

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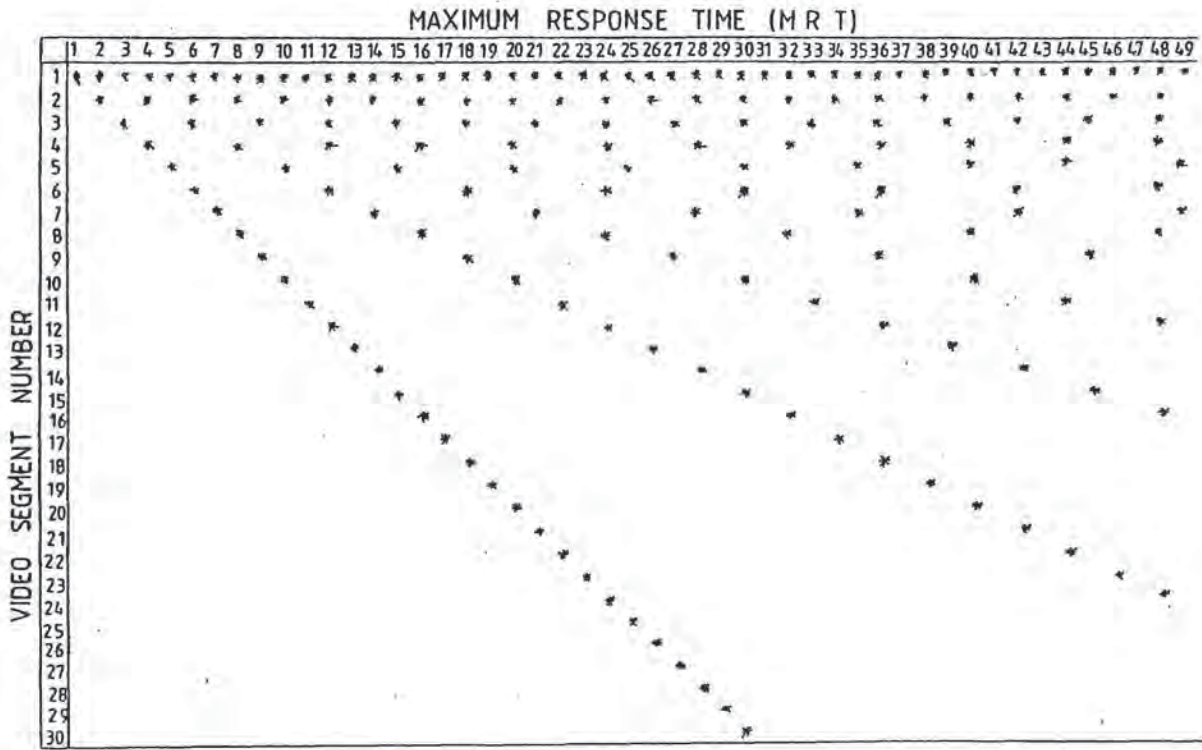
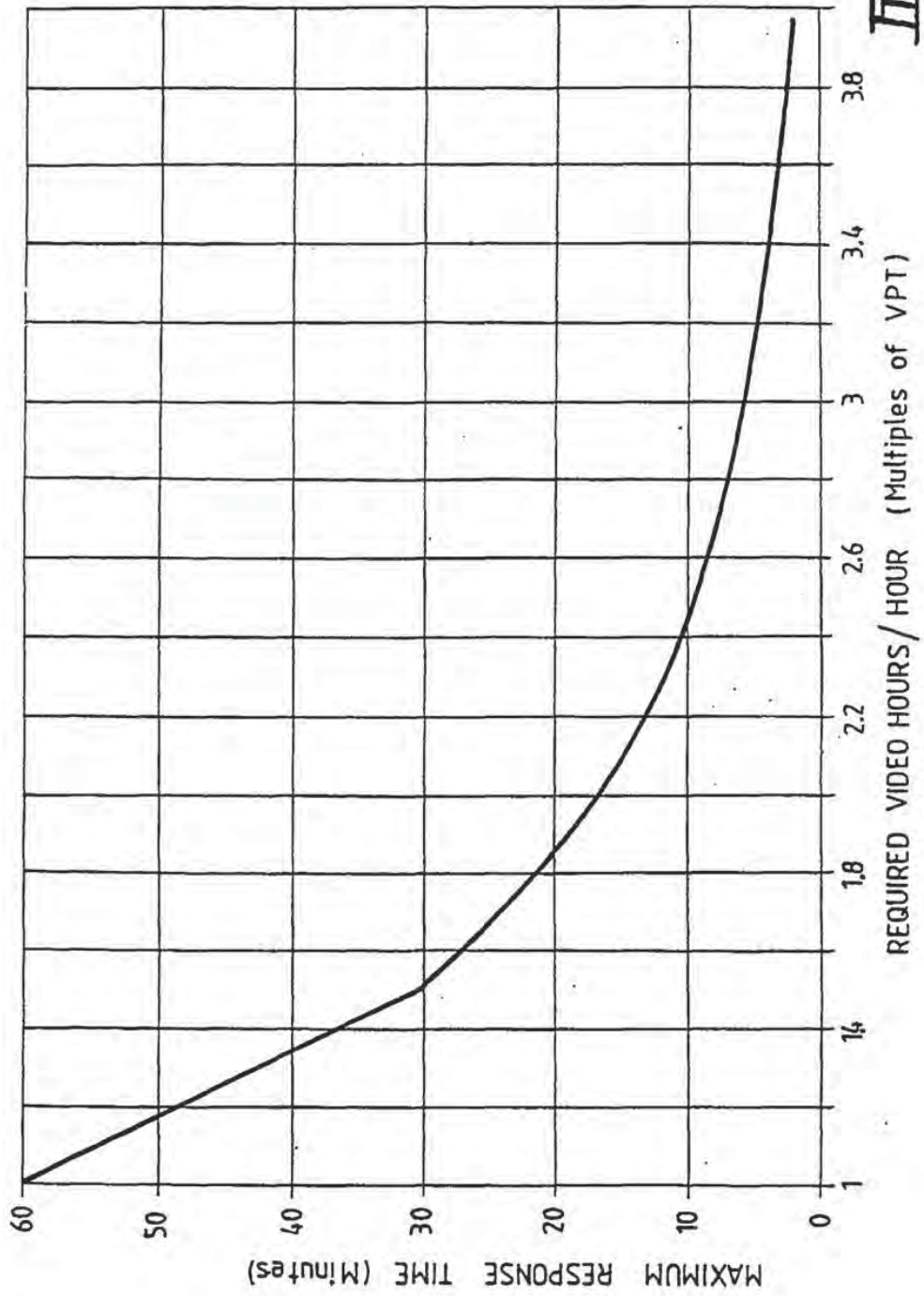


FIG. 5.

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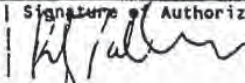
FIG. 6.



**SUBSTITUTE SHEET**

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 90/00370

|   |   |                            |
|---|---|----------------------------|
| <b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) 6  |   |                            |
| According to International Patent Classification (IPC) or to both National Classification and IPC   |   |                            |
| Int. Cl. <sup>5</sup> H04H 1/00, H04N 7/167, G11B 27/36   |   |                            |
| <b>II. FIELDS SEARCHED</b>  |   |                            |
| Minimum Documentation Searched 7  |   |                            |
| Classification System   | Classification Symbols  |                            |
| IPC   | H04H 1/00, H04N 7/16, 7/167, G11B 27/36   |                            |
| Documentation Searched other than Minimum Documentation<br>to the Extent that such Documents are Included in the Fields Searched 8  |   |                            |
| AU : IPC as above; Australian Classification 05.42  |   |                            |
| <b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 9   |   |                            |
| Category*   | Citation of Document, <sup>11</sup> with indication, where appropriate,<br>of the relevant passages 12  | Relevant to<br>Claim No 13 |
| X   | US,A, 4849817 (SHORT) 18 July 1989 (18.07.89)<br>See Figs 5-7, column 8 line 60 to column 9 line 54   | (1,8,13,16)                |
| X   | US,A, 4847690 (PERKINS) 11 July 1989 (11.07.89)<br>See Figs 5-7, column 8 line 27 to column 9 line 21   | (1,8,13,16)                |
| X   | US,A, 4821101 (SHORT) 11 April 1989 (11.04.89)<br>See Figs 5-7, column 8 line 24 to column 9 line 18  | (1,8,13,16)                |
| X   | EP,A, 343930 (SONY CORPORATION) 29 November 1989 (29.11.89)<br>See Figs 1,6,9,11, page 5 lines 5 to 47, page 6 lines 16 to 29,<br>page 9 lines 40 to 57 | (1,8,13,16)                |
| A   | US,A, 4593318 (ENG et al) 3 June 1986 (03.06.86)<br>See Figs 1,13 and Abstract  | (continued)                |
| <p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"Z" document member of the same patent family</p> |   |                            |
| <b>IV. CERTIFICATION</b>  |   |                            |
| Date of the Actual Completion of the International Search   | Date of Mailing of this International Search Report   |                            |
| 9 November 1990 (09.11.90)  | 16 November 1990  |                            |
| International Searching Authority   | Signature of Authorized Officer   |                            |
| Australian Patent Office  |  R. TOLHURST  |                            |

| FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET  |  |
|--|--|
| A  | US,A, 4887152 (MATSUZAKI et al) 12 December 1989 (12.12.89)<br>See Fig 1 and column 1 line 40 to column 2 line 3   |
| V. [ ] OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1   |  |
| This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons: |  |
| 1. [ ]   | Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:  |
| 2. [ ]   | Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:    |
| 3. [ ]   | Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a):  |
| VI. [ ] OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2   |  |
| This International Searching Authority found multiple inventions in this international application as follows:                           |  |
| 1. [ ]   | As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.  |
| 2. [ ]   | As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims: |
| 3. [ ]   | No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:               |
| 4. [ ]   | As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.  |
| Remark on Protest  |  |
| [ ]  | The additional search fees were accompanied by applicant's protest.  |
| [ ]  | No protest accompanied the payment of additional search fees.  |

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 90/00370

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent Document<br>Cited in Search<br>Report |         | Patent Family Members                    |                           |                           |  |
|--|---------|--|---------------------------|---------------------------|--|
| US   | 4849817 | AU 11742/88<br>JP 63226182<br>JP 2192281 | AU 29639/89<br>US 4821101 | EP 279411<br>EP 326830    |  |
| US   | 4847690 | AU 11753/88                              | EP 279410                 | JP 63231942               |  |
| US   | 4821101 | AU 11742/88<br>JP 63226182<br>JP 2192281 | AU 29639/89<br>US 4849817 | EP 279411<br>EP 326830    |  |
| EP   | 343930  | AU 34972/89                              | EP 343930                 | JP 2096982                |  |
| US   | 4593318 | EP 130693<br>JP 60019375                 | ES 533073                 | ES 8503465                |  |
| US   | 4887152 | AU 10779/88<br>EP 277015                 | AU 597143<br>JP 63187984  | BR 8800343<br>JP 63209243 |  |

END OF ANNEX

(19) World Intellectual Property Organization  
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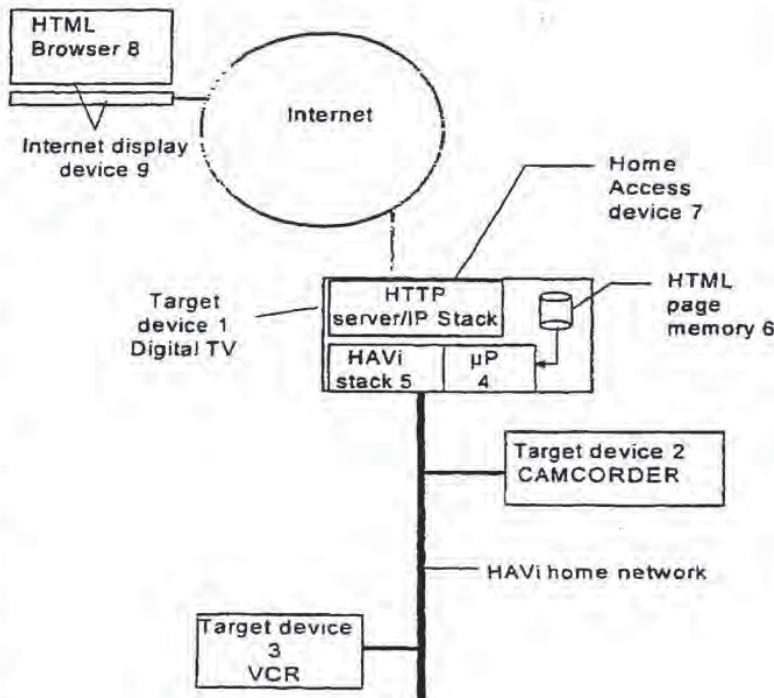
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(75) Inventors/Applicants (for US only): BICHOT, Guillaume [FR/FR]; THOMSON multimedia, 46, quai Alphonse Le Gallo, F-92648 Boulogne Cedex (FR). FANNECHERE, Nicolas [FR/FR]; THOMSON multimedia, 46, quai Alphonse Le Gallo, F-92648 Boulogne Cedex (FR).
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- (71) Applicant (for all designated States except US): THOMSON MULTIMEDIA [FR/FR]; 46, quai Alphonse Le Gallo, F-92100 Boulogne-Billancourt (FR).

[Continued on next page]

(54) Title: METHOD AND DEVICE FOR CONTROLLING A HOME NETWORK FROM AN EXTERNAL COMMUNICATION NETWORK



(57) Abstract: The invention concerns a method for controlling devices in a home network by a control device through a home access server. The method comprises the steps of: providing, in the home access server, a plurality of generic user control protocol pages for each functional component type defined by the home network specification; discovering, by the home access server, of functional components modules in the home network; upon selection of a functional component module through the control device, instantiation of generic user control protocol pages corresponding to said selected functional component module as a function of parameters of said selected functional component module. The invention also concerns a home access server device.

WO 00/76130 A1



**Published:**

— *With international search report.*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Method and device for controlling a home network from an external communication network**

5 The present invention concerns the control of a home network, in particular a HAVi network, such as specified in the Home Audio/Video interoperability specification version 1.0 beta+ of October 23, 1998, from a device external to the network such as a PC connected to the Internet. The invention concerns both the control method and a  
10 device for implementing this method.

The home network architecture allows any connected device to inter-operate across a medium (an IEEE 1394 serial bus for instance) using a command language as specified by HAVi, AV/C CTS or CAL. An in-home network that has to be connected to  
15 the external world has to contain a "home network access" device. The role of this access device is to allow a communication between an in-home device, part of the home network, and an external device, not part of the home network, according to a particular protocol technology, such as the Internet network protocols.

20 The object of the invention is a method for controlling devices in a home network by a control device through a home access server, characterized in that it comprises the steps of:

-providing, in the home access server, a plurality of generic user control protocol pages for each functional component type defined by the home network  
25 specification;

-discovering, by the home access server, of functional components modules in the home network;

-upon selection of a functional component module through the control device, instantiation of generic user control protocol pages corresponding to said  
30 selected functional component module as a function of parameters of said selected functional component module.

The home access device (gateway) stores predefined pages for each functional component module. When a module is to be accessed by an external device  
35 such as a HTML browser, the corresponding pages are adapted to the current status parameters of the module to be controlled, for transmission to the external control device.

40 According to the preferred embodiment, the user control protocol is HTML or JavaScript or Java.

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According to an embodiment, the home access server communicates to the control device a user control protocol page comprising information identifying at least part of discovered functional components.

Another object of the invention is a home access device for accessing a home network through a communication network characterized in that it comprises:

- a protocol stack for communication through the communication network with a control device for user interaction;
- a memory for containing predefined generic user control pages for functional component modules;
- means for determining functional component modules present in the home network, for determining parameters of said functional component modules, and for updating user control pages corresponding to a selected functional component module as a function of the parameters of said selected functional component modules.

Other characteristics and advantages of the invention will appear through the description of a non-limiting embodiment, described in relation with the figures among which:

- figure 1 represents a display of a HTML home page for a home network;
- figure 2 represents a display of a HTML page for VCR control;
- figure 3 represents a display of a HTML page for VCR programming;
- figure 4 is a schematic diagram of the home network corresponding to figure 1;
- figure 5 is a diagram describing the communications between a HAVi network target device, a home network access server and a web browser according to the present invention.

Moreover, five HTML scripts are given at the end of the present description.

Although the embodiment described in the following pages concerns mainly a HAVi home network using IEEE 1394 serial buses as communication medium, the invention is not limited to such a specific environment. The described characteristics may be adapted to other home bus architectures (such as for example CE BUS) and other command/control paradigms such as the AV/C CTS (TA1394) or the CAL language. Some examples relating to AV/C CTS will also be given in order to enhance the description.

For further information relating to HAVi, one should refer to the latest published draft specification, i.e. HAVi 1.0 beta+, of October 23, 1998, available on the HAVi website (<http://www.havi.org>).

5 For further information concerning IEEE 1394 buses, one should refer to the IEEE 1394 - 1995 document published by the IEEE.

The following two possibilities can be taken into consideration for the implementation of the Internet Protocol ('IP') in a home network:

10 - The IP may be transparently carried over the home network. In that case, it shall follow the relevant IETF (Internet Engineering Task Force) specifications. At least some of the devices of the network need to carry the IP protocol stack. For IEEE 1394 serial bus systems, the relevant working group of the IETF is working on 'IPVersion 4' over IEEE 1394 (Internet draft).

15 - The IP may also be terminated in the home network access device. Some of the advantages of this solution are that the IP stack is not required within the home network devices and that the home network is more secure.

The invention is based on this second solution.

20 There is currently no support in existing audio/video home network architectures such as AV/C CTS, CAL or HAVi home networks for access of a device connected to one of these networks over the internet. For example, a user may wish to program his VCR, connected to a HAVi network at home, using a web browser on a PC in his office.

25 The user control paradigm within the Internet is HTML. The home access device (also called home access server) which is connected to the Internet (and thus comprises a complete IP stack), contains a HTTP server that provides the access to a set of HTML pages.

30 The home network according to the present embodiment is HAVi based, although any other technology specifying a command/control protocol to control home equipment such as audio/video equipment may be used.

35 The role of the home access server is to maintain an up-to-date view of the home network configuration. It means that the server maintains a HTML home page with references linked to each equipment present in the network. In HAVi (as well as in AV/C CTS or CAL), once a device is connected to the home network, any other device has the possibility to obtain information concerning the newly connected device.

According to the present embodiment, each device is identified by an icon, stored in the device. HAVi enables the downloading of such information from a target device.

When a new device is connected to the home network, the home page proposed by the server will be updated with a new icon representing the new target device.

Each icon is associated with at least one HTML page dedicated to this device. This HTML page is, according to the present embodiment, a predefined page that has been built in accordance with the home network architecture specification (HAVi, AV/C CTS...). This means that the possibilities - in terms of control - offered to the user through the HTML description are in conformance with the command and response messages described in the corresponding network specification. For example in AV/C CTS, the command 'PLAY', destined to a recording/reproducing device such as a VCR, can be sent with a number of arguments. The home network access server stores a pre-built HTML page for a generic AV/C CTS VCR that will enable the user to access the PLAY function and specify the necessary arguments.

For a network compliant with the HAVi - 1.0b draft specification, a HAVi "home access server" should have in memory HTML pages to provide the control of the specified functions of the device interface (status, power) and the following functional component interfaces:

TUNER,  
VCR,  
CLOCK,  
AV CAMERA,  
AV DISC,  
WEB PROXY,  
MODEM,  
AV DISPLAY,  
DISPLAY/AMPLIFIER,  
AV CONVERTER

For a network compliant with the AV/C CTS - 2.01 specification, an AV/C CTS "home access server" should have in memory HTML pages to provide the control of the specified functions of the common unit (status, power) and the following sub-units:

TUNER,  
VCR

Figure 4 shows a typical home network configuration. The network of figure 4 contains a display terminal (typically a PC) connected to the Internet. The display terminal contains a WEB browser to allow the user to control home devices through the "home access device" using HTML. The level of functionalities the WEB browser has to include is out of the scope of this document. According to the present embodiment it is at least HTML compliant. It may further support such languages as Javascript or Java. The present embodiment is based only on HTML. However, the support of JavaScript or Java can be used to reinforce the possibilities to control some specific devices. In particular, it would be possible to handle asynchronous events as such the "end of tape" event generated by a VCR.

The network also comprises the home access device 1 that includes the "home access server" (a HTTP server according to the present embodiment). This home access device is also a digital TV and, therefore, includes a display component and a tuner component.

The network also comprises two other end devices as a VCR 3 and a camcorder 2.

All devices are HAVi compliant.

The "home access device" contains the Internet Protocol (IP) stack and equipment to enable connection to the Internet. Typically, "the home access device" could also be a cable set top box connected to a display, or any other device. Its IP stack would typically comprise:

- a cable modem
- IP
- TCP/UDP
- HTTP

HTTP (1.1 - RFC 2068) is a simple command/response based protocol. Two objects are involved in HTTP: the client, sending a command, and an origin server receiving the command and sending back a response. By extension, a HTTP server is called a WEB server.

The most used command is GET <URL> where the Uniform Resource Locator points to the object to be obtained, This reference comprises two parts: the first points to the server equipment and the second points to the object concerned by the command. This target object can be an existing object such as a HTML script or a bit-map or any other type of object. The object reference can also point to something that

has a meaning for the WEB server but does not represent any 'real' object. This mechanism is used for instance in an HTML script to signal to a WEB server that the user just selected an icon: the HTML script associates this icon with a URL which will be sent to the WEB server (through the GET command) when the user selects/activates the icon.

A URL reference can include parameters as a command from upper layer protocols.

The "home access server" offers the access to the up-to-date home page. An example of such a home page is given by figure 1. This home page corresponds to the network of figure 4.

The corresponding HTML page is defined by Script 1 (see below). Each time a new device is added to the network the "home access server" updates this home page script by adding the appropriate line(s).

The line corresponding to the VCR 3 is:

```
"<A href="havivcr"><IMG src="tvicons/photovr911hf_sm.gif" width="150" height="44" alt="Thomson hz2 VCR"></A>
```

- "tvicons photovr911hf\_sm.gif" is the (relative) reference to a picture (icon) representing the new device type. Internally, the "home access device" makes an association between this icon and the home network address of the device (the SEID/GUID identifiers for HAVi). This icon has previously been obtained by the "home access server" from the target VCR device itself through the appropriate HAVi mechanism. In a HAVi network, during the device discovery process, any device can obtain the names from the 1394-1995 ROM memory of the new device.

- "havivcr" is the (relative) reference that will be sent to the "home access server", when the user selects the VCR icon. It corresponds to the first HTML page allowing the control of the chosen device. This reference must be unique in this page. Thus, if a second VCR is connected to the network, the "home access server" will add a new line, for example as follows: "<A href="havivcr2"><IMG src=""tvicons/photovr911hf\_sm.gif" width="150" height="44" alt="RCA YY VCR "></A>".

- "Thomson hz2 VCR" is the name of the device of the functional component. This name has been previously obtained by the "home access server" from the target device itself through HAVi or lower layer mechanism. In a HAVi network, during the discovery process, any appliance can get these names from the 1394-1995 ROM

memory of the new device. It is also possible to get this information - in a HAVi network- through the registry service where all network components (device, functional components, application) are registered.

5           Each time a device is removed from the home network, the "home access server" updates the home page script removing the corresponding line.

          According to a variant embodiment, the "home access server" offers access to a number of its own applications through the home page.

10

          The "home access device" stores a number of predefined generic HTML page sets. According to the present embodiment, it stores one set for each type of well-specified components (for HAVi, these components will be TUNER, VCR, CAMERA, DISC,...). Script 2 shows the first HTML script of the generic set that allows the control of a VCR type component. This page is downloaded by the web browser (of the Internet display device), once the user selects the icon representing this equipment (Figure 1). Of course, the VCR page set could provide the access to all specified functionalities of the HAVi VCR as described in the specification (HAVi 1.0Beta+ - chapter 6.2). However, it is up to the designer of the "home access server" to decide whether to offer the access to only a subset of these functions (offering the remote access of the "ejectmedia" capability for ejecting the tape may make no sense for a VCR in the present context), or to all functions.

15

          The "home access server" has to handle the situation where two devices (or more) of the same type are present on the home network. Since it is the same HTML script (Script 2) which will be sent for several devices of the same type, the "home access server" needs to make the association between the HTTP commands and the different target devices. This association is made when the user select the device from the home page.

25

30           The "home access device" will identify:  
          - the user through the IP address of the display device he is using; and  
          - the target device to be controlled due to the association between the icon selected by the user and the home network address of the associated device.

30

35           As an example, we will consider the already mentioned case of a user wanting to program his VCR from an office PC. Figure 5 details the step-by-step process that permits to track the different protocol interactions between the user agent (the WEB browser), the "Home access server" and the target device (the VCR).

35

First, the user has to contact his home through his WEB browser. As shown in the 'Address' field of Figure 1, the user enters his home page reference. The WEB browser then sends a HTTP command over the Internet protocol stack to the "home access server". This command is the HTTP GET command as described above.

5 As previously described, the "home access server" maintains a home page according to the architecture of the home network it is connected to. Therefore, once it receives the HTTP GET command, it can send back the GET response that contains the HTML script of the up-to-date home page (see end of step 1, figure 5).

10 The user then selects the VCR icon (or bitmap). The attached URL ('havivcr') is sent to the "home access server" via a HTTP GET command. Before sending back the HTML script to allow VCR control, the "home access server" has to determine the status of the VCR (e.g. the VCR can be either in PLAY mode or in REC mode or another mode). The HAVi command "GetMediaTransport" is used to obtain this status.  
15 According to the result of this command, the "home access server" will send back the corresponding VCR control HTML script:

If the VCR is in PLAY mode, the HTML script to be sent should reflect this status. For example, the 'STOP icon' (see figure 2) may be displayed in a certain way to show that it may be activated.

20 For our scenario, we assume the VCR is in stand-by mode. Therefore, the returned HTML script corresponds to the Script 2, and the corresponding HTML page is that of Figure 2.

In this example, the VCR generic home page gives the access to five basic  
25 functions: Play, Fast Forward, Rewind, Stop and Record, as well as the programming tool used to select a television event to be recorded.

According to the present example, the first action decided by the user is to rewind the tape. He consequently selects the Rewind icon. The WEB browser then  
30 sends the HTTP GET command linked with the "vcrw" reference as URL (as detailed in the HTML Script 2).

The "Home access server" then sends the VCR FAST REVERSE HAVi command to the target. Once the command is complete, the "Home access server" will send back, as HTTP response, the HTML page referenced by "vcrw" (see Script 3).  
35 According to the status embedded in the HAVi response, the "Home access server" will first update the page with the result of the REWIND action ('success' or 'failure' for example).

The next user action consists in programming the VCR to record a movie, today, at 6pm, the program source being the digital TV. The WEB browser sends the HTTP GET command linked with the "vcrprogram" reference as URL (as described in the HTML script 2). The "home access server" sends back the corresponding HTML script that allows a user to program the VCR. The relevant script is Script 4, while the corresponding display is that shown by figure 3.

The user enters the information as presented above and confirms by clicking on the 'Confirm' button. The information is sent to the "home access server" through the GET URL command as described in the chart of figure 5 (step 5). The "home access server" then calls the HAVi resource manager to schedule the action. As specified in the HAVi specification, the resource manager will check the availability of the target for the scheduled time, the required bandwidth, etc.

Once the HAVi scheduled action is acknowledged, the "home access server", according to the status embedded in the HAVi response, will send back to the client (WEB browser) the HTML page which contains the result of the VCR programming (see Script 5).

#### Advantages of the invention:

- Allows the control of the "non IP" in-home network devices from the Internet.

- Only the "home access device" is IP (Internet + HTTP + HTML) aware. The Internet protocols like HTTP, HTML are often updated. The consequence of this advantage is that is that the home network devices are not concerned by these changes. The "home access device and, thus, the "home access server" are only concerned by the Internet protocol updates. The devices themselves store neither the IP stack, nor HTML page components.

- This invention is valuable for all well-known Audio Video command languages such as: AV/C CTS, CAL and HAVi.



- Script 1: home page HTML script

```
5 <HTML>
  <HEAD><TITLE> home network homepage </TITLE></HEAD>

  <BODY bgcolor="#ffffe6" text="#000000"
  link="#ff0000" alink="#ff0080" vlink="#fdca42">

  <CENTER><H1>Welcome to the Mr Dupont Home </H1></CENTER>

10   The following devices are currently available
   <HR>
   <IMG src="tvicons/photocc6371_sm.gif" width="150" height="119" alt="RCA
xyz Camcorder">—
15   <IMG src="tvicons/photof27242gy_sm.gif" width="138" height="150" alt="
Telefunken Wxx1 Digital TV">—
   <A href="havivcr"><IMG src="tvicons/photovr911hf_sm.gif" width="150"
height="44" alt="Thomson hz2 VCR"></A>

20   </BODY>
   </HTML>
```

- Script 2: VCR home page : generic HTML script

```

5  <HTML>
    <HEAD><TITLE>VCR home page</TITLE></HEAD>
    <BODY bgcolor="#ffffe6" text="#000000"
10  link="#ff0000" alink="#ff0080" vlink="#fdca42">

        To <A href="vcrprogram">Program</A> my VCR
        <SELECT size=1 name="Video Source"><OPTION selected> From the
Telefunken Wxx1 Digital TV<OPTION>from the RCA xyz Camcorder</SELECT>
15  <CENTER><TABLE width=80% height=100%>
    <TR><TD>

        <CENTER><H1>VCR CONTROL</H1></CENTER>
        <CENTER><TABLE border=1 width="90%">
15  <TR>
    <TD><IMG src="tvicons/stop20.gif" width="24" height="22"
alt="STOP"></TD>
    <TD><A href="vcrplay"><IMG src="tvicons/010play.gif" width="24"
20  height="22" alt="PLAY"></A></TD>
    <TD><A href="vcrff"><IMG src="tvicons/010fasts.gif" width="24" height="22"
alt="FAST FORWARD"></A></TD>
    <TD><A href="vcrww"><IMG src="tvicons/010slows.gif" width="24"
height="22" alt="REWIND"></A></TD>
25  <TD><A href="vcrrec"><IMG src="tvicons/record.gif" width="24" height="22"
alt="RECORD"></A></TD>
    </TR>
    </TABLE></CENTER>
    </TD></TR>
30  <TR><TD>
        <CENTER><A href="havihome"><IMG src="tvicons/exit02.gif" width="36"
height="34" alt="HOME PAGE"></A> to go back to the home page</CENTER>
    </BODY>
    </HTML>
35

```

## - Script 3: REWIND result HTML script

```

5  <HTML>
  <HEAD><TITLE>VCR REWIND page</TITLE></HEAD>

  <BODY bgcolor="#ffffe6" text="#000000"
  link="#ff0000" alink="#ff0080" vlink="#fdca42">
  <CENTER><H1>VCR CONTROL</H1></CENTER>
  <CENTER>
10  <TR>
  <TD><H2>The tape is rewinded</H2></TD>
  <TD><A href="havivcr">return to the VCR front panel

  </TR>
15  </CENTER>
  </TD></TR>
  <TR><TD>
  <CENTER><A href ="havihome"><IMG
  src="file:///E:/htmleditors/tvicons/EXIT02.gif" width="36" height="34" alt="HOME
20  PAGE"></A> to go back to the home page</CENTER>
  </BODY>
  </HTML>

```

## - Script 4: VCR programming form : HTML script

```

25  HTML>
  <HEAD><TITLE>VCR program page</TITLE></HEAD>
  <BODY bgcolor="#ffffe6" text="#000000"
  link="#ff0000" alink="#ff0080" vlink="#fdca42">
  <FORM METHOD="GET" ACTION="vcrprogramend ">
30  <TABLE BORDER=0 CELSPACING=0 CELLPADDING=8
  WIDTH="70%"><TR VALIGN=TOP><TD>
  <CENTER><H1>VCR PROGRAMMATION</H1></CENTER>
  <CENTER>
  <TABLE BORDER=0 CELSPACING=0 CELLPADDING=2>
35  <TR><TD ALIGN=RIGHT><FONT SIZE=3 FACE="Arial, Helvetica">
  CHANNEL</FONT></TD><TD ALIGN=RIGHT><SELECT size=1
  name="Content"><OPTION selected>Current channel<OPTION>Channel 1
  <OPTION>Channel 2
  <OPTION>Channel 3

```

```

5      <OPTION>Channel 4
      <OPTION>Channel 5
      <OPTION>Channel 6</SELECT></TD></TR>
      <TR><TD ALIGN=RIGHT>
      <FONT SIZE=3 FACE="Arial, Helvetica">
      START TIME</FONT></TD><TD><INPUT TYPE="TEXT" NAME="start"
10 SIZE=14></TD></TR><TR><TD ALIGN=RIGHT>
      <FONT SIZE=3 FACE="Arial, Helvetica">
      END TIME </FONT></TD><TD><INPUT TYPE="TEXT" NAME="end"
10 SIZE=14></TD></TR>
      <BR>
      <TR><TD>
      <CENTER>
      <FONT SIZE=3 COLOR="#FF0000" FACE="Arial, Helvetica">
15 <INPUT type="submit" value="Confirm">
      <INPUT TYPE="RESET" VALUE="CLEAR">
      </FONT>
      </CENTER>
      </TD></TR></TABLE>
20 </FORM>
      <TABLE BORDER=0 CELLSPACING=0 CELLPADDING=0
      WIDTH="70%"><TR VALIGN=TOP><TD>
      <CENTER>
      <A href="havihome"><IMG src="tvicons/exit02.gif" width="36" height="34"
25 alt="HOME PAGE"></A> to go back to the home page</CENTER>
      </TD></TR></TABLE>
      <BR><BR><BR>
      </CENTER>
      </BODY>
30 </HTML>

```

- Script 5: Figure 1 - VCR programming: resulting HTML script

```
<HTML>
<HEAD><TITLE>VCR End of Schedule programming</TITLE></HEAD>

<BODY bgcolor="#ffffe6" text="#000000"
link="#ff0000" alink="#ff0080" vlink="#fdca42">
<CENTER><H1>VCR CONTROL</H1></CENTER>
<CENTER>
<TR>
<TD><H2>The programming is done</H2></TD>
<TD><A href="havivcr">return to the VCR front panel

</TR>
</CENTER>
</TD></TR>
<TR><TD>
<CENTER><A href ="havihome"><IMG
src="file:///E:/htmleditors/tvicons/EXIT02.gif" width="36" height="34" alt="HOME
PAGE"></A> to go back to the home page</CENTER>
</BODY>
</HTML>
```

### Claims

5 1. Method for controlling devices in a home network by a control device through a home access server, characterized in that it comprises the steps of:

-providing, in the home access server, a plurality of generic user control protocol pages for each functional component type defined by the home network specification;

10 -discovering, by the home access server, of functional components modules in the home network;

-upon selection of a functional component module through the control device, instantiation of generic user control protocol pages corresponding to said selected functional component module as a function of parameters of said selected functional component module.

15

2. Method according to claim 1, wherein said user control protocol is HTML or JavaScript or Java.

20 3. Method according to one of the claims 1 or 2, wherein the home access server communicates to the control device a user control protocol page comprising information identifying at least part of discovered functional components.

25 4. Home access device for accessing a home network through a communication network characterized in that it comprises:

25

- a protocol stack for communication through the communication network with a control device for user interaction;

- a memory for containing predefined generic user control pages for functional component modules;

30

- means for determining functional component modules present in the home network, for determining parameters of said functional component modules, and for updating user control pages corresponding to a selected functional component module as a function of the parameters of said selected functional component modules.

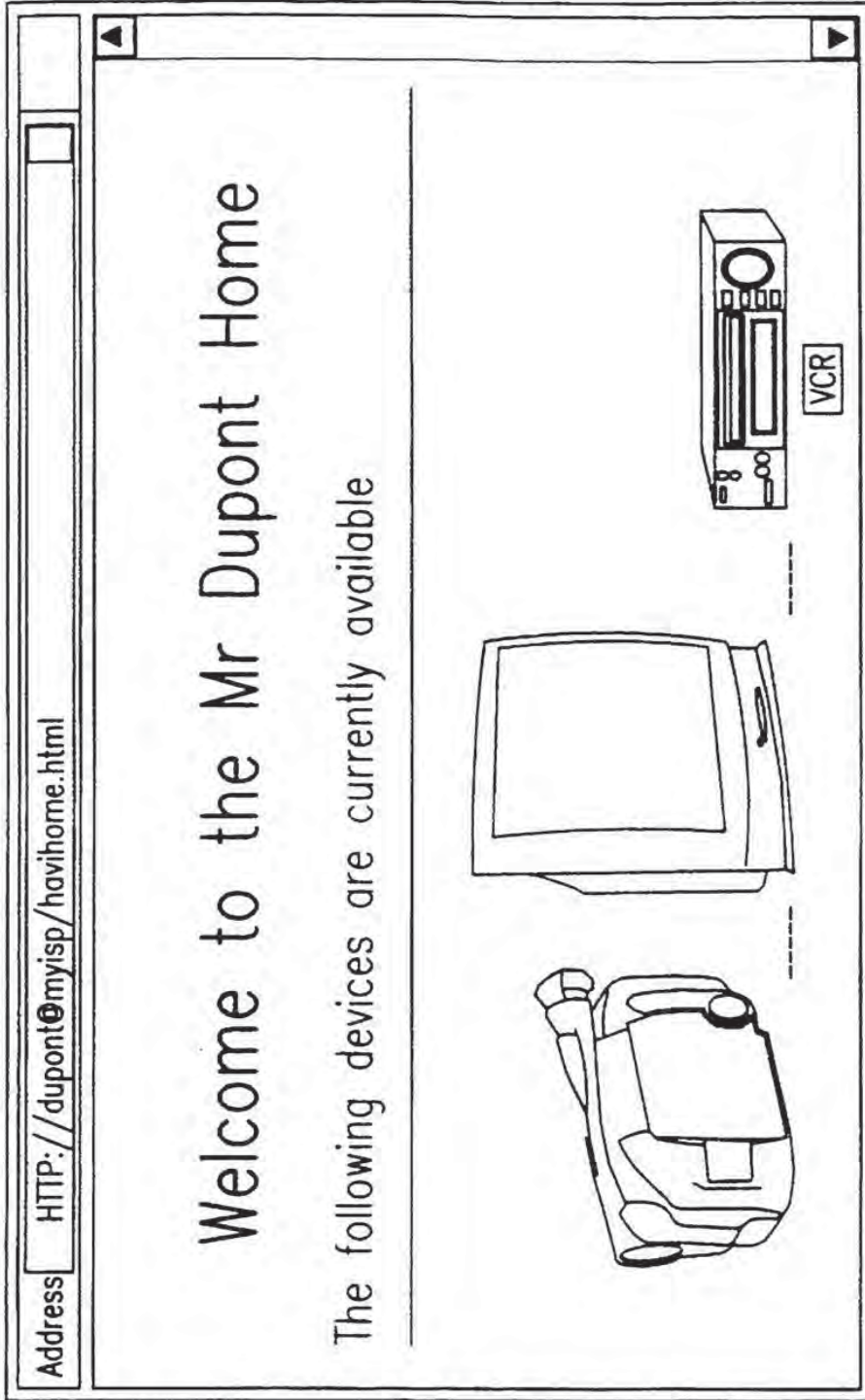


FIG.1

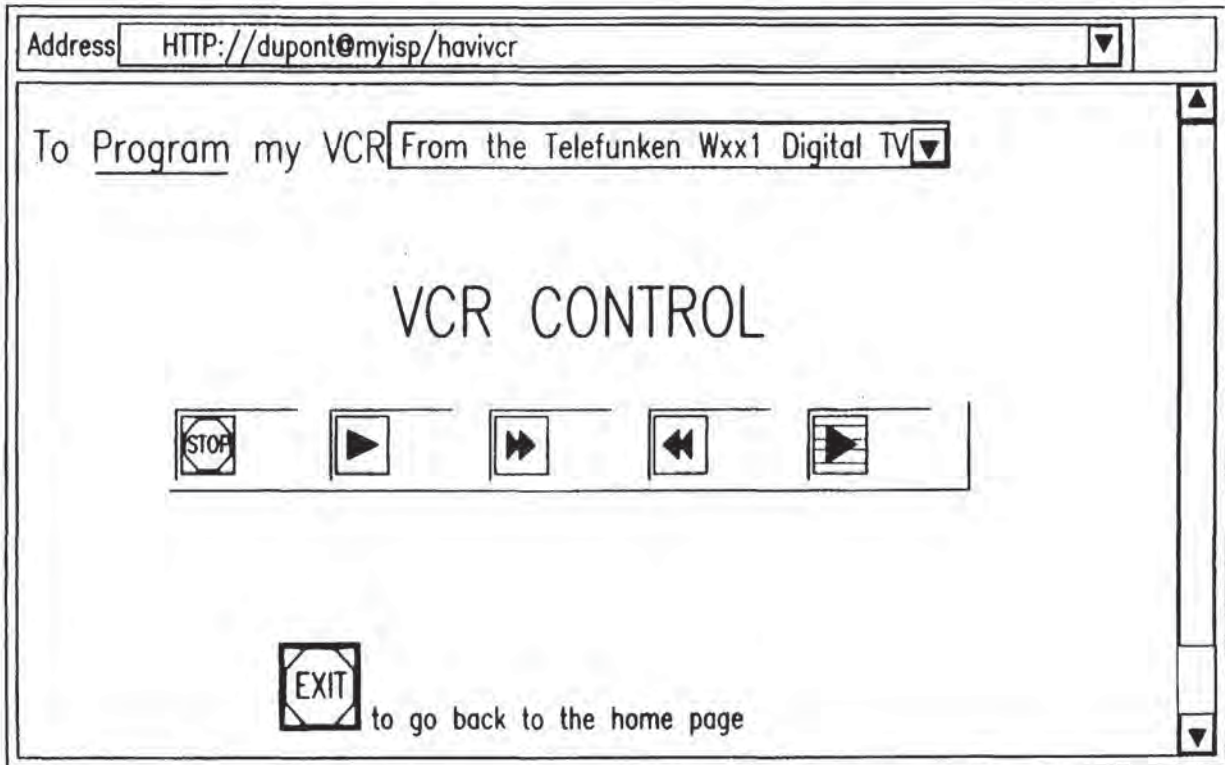


FIG.2



Address  Links

# VCR SCHEDULING

CHANNEL

START TIME

END TIME

to go back to the home page

FIG.3

4 / 5

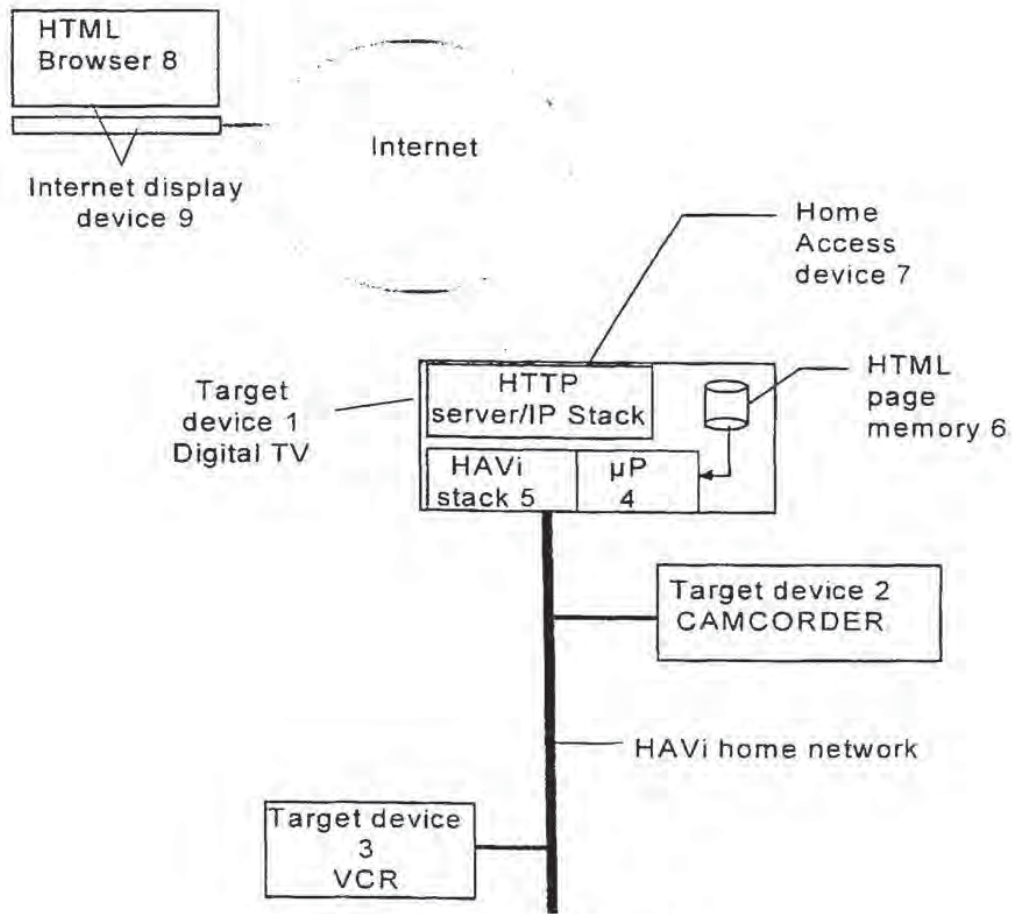


FIG. 4

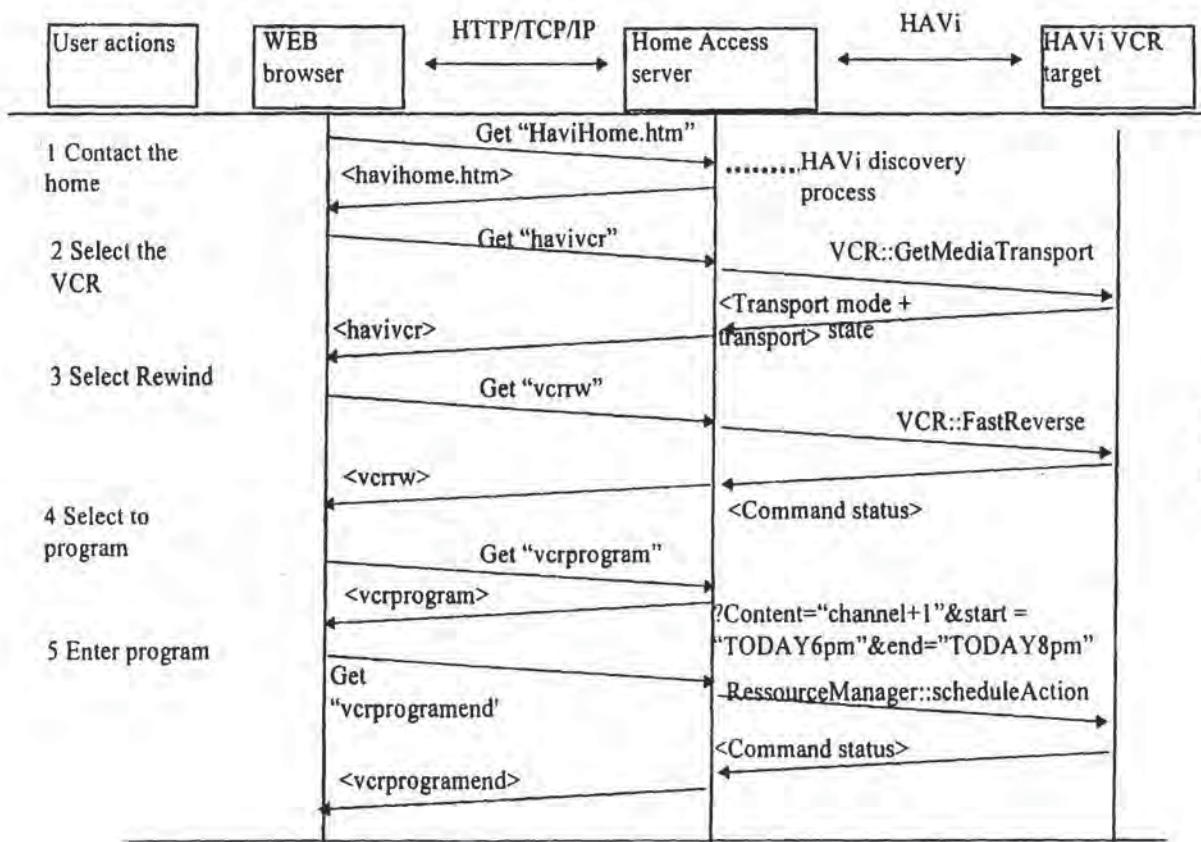


Fig. 5

5 / 5

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 00/05015

|   |  |  |
|---|--|--|
| A. CLASSIFICATION OF SUBJECT MATTER<br>IPC 7 H04L12/28 H04L12/66 H04L29/06  |  |  |
| According to international Patent Classification (IPC) or to both national classification and IPC   |  |  |
| B. FIELDS SEARCHED<br>Minimum documentation searched (classification system followed by classification symbols)<br>IPC 7 H04L H04M  |  |  |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched   |  |  |
| Electronic data base consulted during the international search (name of data base and, where practical, search terms used)<br>EPO-Internal, WPI Data, PAJ, INSPEC   |  |  |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT  |  |  |
| Category <sup>1</sup>   | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No.  |
| X   | CORCORAN P M: "MAPPING HOME-NETWORK APPLIANCES TO TCP/IP SOCKETS USING A THREE-TIERED HOME GATEWAY ARCHITECTURE" IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, IEEE INC. NEW YORK, US, vol. 44, no. 3, 4 June 1998 (1998-06-04), pages 729-736, XP000921454 ISSN: 0098-3063<br>abstract<br>page 729, column 2, line 1 - line 29<br>page 730, column 1, line 13 -column 2, line 2<br>page 731, column 1, line 27 -column 2, line 11<br>page 732, column 2, line 26 - line 43<br>page 733, column 2, line 28 - line 43<br>page 734, column 2, line 3 -page 735, column 2, line 5<br>---<br>-/-- | 1-4  |
| <input checked="" type="checkbox"/>   | Further documents are listed in the continuation of box C.   | <input checked="" type="checkbox"/> Patent family members are listed in annex. |
| <sup>1</sup> Special categories of cited documents  |  |  |
| <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"Z" document member of the same patent family</p> |  |  |
| Date of the actual completion of the international search<br>15 September 2000  |  | Date of mailing of the international search report<br>28/09/2000               |
| Name and mailing address of the ISA<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016  |  | Authorized officer<br><br>Tous Fajardo, J                                      |

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/EP 00/05015

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |   |                       |
|--|---|-----------------------|
| Category   | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
| X  | <p>KLESPER T: "DER INTERNET-ZUGRIFF AUF S<br/>LON. WELTWEITER ZUGRIFF AUF DIE SENSORIK<br/>UND AKTORIK VON<br/>AUTOMATISIERUNGS-PROJEKTEN"<br/>ELEKTRONIK,DE,FRANZIS VERLAG GMBH.<br/>MUNCHEN,<br/>vol. 47, no. 8,<br/>14 April 1998 (1998-04-14), page<br/>60,62,64,66 XP000780190<br/>ISSN: 0013-5658<br/>page 60, column 2, line 10 -page 62,<br/>column 1, line 12<br/>page 62, column 1, line 27 -column 2, line<br/>25<br/>page 64, column 1, line 4 - line 7<br/>page 64, column 2, line 1 -page 66, column<br/>2, line 1<br/>figure 3</p> | 1-4                   |
| A  | <p>-----<br/>CORCORAN P M ET AL: "User interface<br/>technologies for home appliances and<br/>networks"<br/>IEEE TRANSACTIONS ON CONSUMER<br/>ELECTRONICS,US,IEEE INC. NEW YORK,<br/>vol. 44, no. 3, 2 June 1998 (1998-06-02),<br/>pages 679-685, XP002138632<br/>ISSN: 0098-3063<br/>The whole document</p>  | 1-4                   |
| A  | <p>-----<br/>WO 98 53581 A (COACTIVE NETWORKS INC)<br/>26 November 1998 (1998-11-26)<br/>page 2, line 20 - line 30<br/>page 4, line 5 -page 6, line 7<br/>page 7, line 29 -page 8, line 7<br/>page 9, line 11 -page 10, line 1</p>  | 1-4                   |
| A  | <p>-----<br/>CORCORAN P M ET AL: "BROWSER-STYLE<br/>INTERFACES TO A HOME AUTOMATION NETWORK"<br/>IEEE TRANSACTIONS ON CONSUMER<br/>ELECTRONICS,US,IEEE INC. NEW YORK,<br/>vol. 43, no. 4,<br/>1 November 1997 (1997-11-01), pages<br/>1063-1069, XP000768559<br/>ISSN: 0098-3063<br/>abstract<br/>page 1064, column 1, line 5 - line 11<br/>page 1065, column 1, line 1 - line 20<br/>page 1065, column 2, line 5 -page 1066,<br/>column 1, line 25</p> <p>-----</p>  | 1-4                   |

2

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

page 2 of 2

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/05015

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---------------------|----------------------------|---------------------|
| W0 9853581 A                              | 26-11-1998          | EP 1013047 A               | 28-06-2000          |



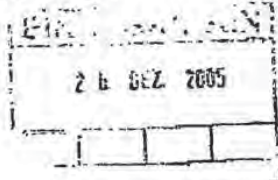
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|  |                       |                    |
|--|-----------------------|--------------------|
| Application No.<br>99 909 867.6 - 2202 | Pat.<br>TV 990302 PEP | Date<br>27.12.2005 |
| Applicant<br>Tivo, Inc.                |                       |                    |

Communication pursuant to Article 96(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(2) and 89(2) and (4) EPC.

One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (Rule 36(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 98(3) EPC).



Fragua, M  
Primary Examiner  
for the Examining Division

Enclosure(s): 4 page/s reasons (Form 2906)

(6.)

|           |            |     |
|-----------|------------|-----|
| FRISTENDE | 8. 5. 2006 | 3/1 |
| VOR- 1.   | 2. 5. 2006 | 5/1 |
| FRIST 2.  |            |     |
| ERLEDIGT  |            |     |



Beschreibung/Pr. olli (Anlage)

Communication/Miracles (An.

Modification/Process-verbal (Annex)

Datum:  
Date: 27.12.2005Blatt:  
Sheet: 1  
FeuilleAnmeld-Nr.:  
Application No.: 99 909 867.6  
Demande n°:

The examination is being carried out on the following application documents:

#### Description, Pages

1-18 as published

#### Claims, Numbers

1-26 as annexed to the International Preliminary Examination Report

#### Drawings, Sheets

1/12-12/12 as published

\*\*\*\*\*

- 1 Reference is made to the following documents; the numbering will be adhered to in the rest of the procedure:

D1: US-A-5 438 423 (LYNCH ET AL.) 1 August 1995 (1995-08-01)

D2: EP-A-0 726 574 (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD) 14 August 1996 (1996-08-14)

- 2 Claims 1 and 13 have been drafted as separate independent claims of "method" category.  
Claims 14 and 26 have been drafted as separate independent claims of "apparatus" category.

Under Article 84 in combination with Rule 29(2) EPC an application may contain more than one independent claim in a particular category only if the subject matter claimed falls within one or more of the exceptional situations set out in paragraphs (a), (b) or (c) of Rule 29(2) EPC. This is not the case in the present application however, for the



Beschuld/P  
Antrag (Anlage)

Communication/Minutes (An.

Notification/Procès-verbal (Annexe)

Datum  
Date 27.12.2005Blatt  
Sheet 2  
FolieAnmeldung-Nr.  
Application No.: 99 909 867.6  
Demande n°:

following reasons:

- Claims 13 and 26 describe conceptual models from which the process described in claim 1 and the apparatus described in claim 14 represent particular embodiments respectively.

- Claimed features 1 and 13 could be covered in a single conceptual claim as, for instance, the present claim 13 followed by a dependent claim covering the particular features stated in claim 1.

- Claimed features 14 and 26 could be covered in a single conceptual claim as, for instance, the present claim 26 followed by a dependent claim covering the particular features stated in claim 14.

The applicant is requested to file an amended set of claims which complies with Rule 29(2). Failure to do so, or to submit convincing arguments as to why the current set of claims does in fact comply with these provisions, will lead to refusal of the application under Article 97(1) EPC.

Drafting only one independent claim in each category will also serve to avoid objections under Article 82 EPC.

2.1 The attention of the Applicant is drawn to the fact that the claims may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Art. 123(2) EPC).

3 The vague and imprecise statement " ... one skilled in the art will readily appreciate that other applications may be substituted for those set forth herein without departing from the spirit and scope of the present invention" in the description in page 18, lines 6 to 8, implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity of the claims (Article 84 EPC) when used to interpret them (see Guidelines, C-III, 4.3a).

This statement should therefore be either eliminated or amended by specifying that the



Beschäftigt von (Anlage)

Communication/Minutes (A)

Notification/Procès-verbal (Annexe)

Datum  
Date  
Date 27.12.2005Seiten  
Sheet  
Folien 3Anwirts-Nr.:  
Application No.: 99 909 867.6  
Date: n°:

scope is strictly the one defined in the appended claims, to remove this inconsistency.

#### 4 Further objections in the application:

- 4.1 The set of claims annexed to the International Preliminary Examination Report, which has been provided by the Applicant, present typographical mistakes in claim 13 (antepenultimate line) and claim 22 (third line) that don't allow to read completely their contents.  
The applicant is therefore requested to provide the Examining Division with a legible set of claims.
- 4.2 Any new independent claim submitted should be properly cast in the two part form (Rule 29(1) EPC), with those features which in combination are part of the prior art (see documents D1, D2) being placed in the preamble. If, however, the applicant is of the opinion that the two-part form would be inappropriate, then reasons therefor should be provided in the letter of reply.
- 4.3 The features of the claims should be provided with reference signs placed in parentheses to increase the intelligibility of the claims (Rule 29(7) EPC). This applies to both the preamble and characterising portion (see the Guidelines, C-III, 4.11).
- 4.4 The applicant should also indicate in the letter of reply the difference of the subject-matter of the new claims vis-à-vis the state of the art represented by documents D1, D2 (novelty, Art. 54 EPC) and the significance thereof (inventive step, Art. 56 EPC).
- 4.5 To meet the requirements of Rule 27(1)(b) EPC, documents D1, D2 should be identified in the description and the relevant background art disclosed therein should be briefly discussed.
- 4.6 The description must be brought into conformity with the new claims to be filed (Rule 27(1)(c) EPC). Care should be taken during revision, especially of the introductory portion including any statements of problem or advantage, not to add subject-matter



Beschold/Pn. JB (Anlage)

Communication/Minutes (Ann.)

Notification/Procès-verbal (Annex)

Date: 27.12.2005

Pages: 4

Annexes: Application No.: 99 909 867.6

which extends beyond the content of the Application as originally filed, (Article 123(2) EPC).

4.7 In order to facilitate the examination of the conformity of the amended application with the requirements of Article 123(2) EPC, the applicant is requested to clearly identify the amendments carried out, irrespective of whether they concern amendments by addition, replacement or deletion, and to indicate the passages of the application as filed on which these amendments are based.

If the applicant regards it as appropriate these indications could be submitted in handwritten form on a copy of the relevant parts of the application as filed.

\*\*\*\*\*

## Current Claims

1. A process for the simultaneous storage and play back of multimedia data, comprising the steps of:

accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC;

tuning said TV signals to a specific program;

providing at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation;

providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components;

storing said video and audio components on a storage device;

providing at least one Output Section, wherein said Output Section extracts said video and audio components from a storage device;

wherein said Output Section assembles said video and audio components into an MPEG stream;

wherein said Output Section sends said MPEG stream to a decoder;

wherein said decoder converts said MPEG stream into TV output signals;

wherein said decoder delivers said TV output signals to a TV receiver;

wherein the storing and extracting of said video and audio components from said storage device can be performed simultaneously; and

accepting control commands from a user, wherein said control commands are sent through the system and affect the flow of said MPEG stream.

2. The process of claim 1, wherein said Input Section directs said MPEG stream to the destination indicated by said control commands.

3. The process of claim 1, wherein said Output Section extracts said video and

audio components from the storage device indicated by said control commands.

4. The process of claim 1, further comprising the step of:  
creating custom video output sequences, wherein said sequences are specified by a user or program control.

5. The process of claim 1, wherein said Media Switch calculates time stamp values or extracts time stamp values from a digital TV stream and logically associates said time stamp values to said video and audio components.

6. The process of claim 1, further comprising the steps of:  
placing said video component into a circular video buffer;  
placing said audio component into a circular audio buffer;  
posting an event in a circular event buffer, wherein said event contains an indication that a video or audio component was found and the location of said video or audio component in said circular video or audio buffer;  
sending notice of said event posting;  
receiving said notice;  
retrieving said event posting from said event buffer;  
indexing into the appropriate buffer indicated by the type and location information in said event buffer; and  
generating a buffer containing the logical audio or video segments in order, including ancillary information, wherein each of said logical segments points to the appropriate circular buffer location where corresponding audio or video components have been placed.

7. The process of claim 1, further comprising the step of:  
increasing or decreasing the decoder system clock rate for fast playback, fast reverse playback, slow playback, or slow reverse.

8. The process of claim 1, further comprising the step of:

combining system audio cues and on-screen displays with said TV output signals.

9. The process of claim 1, further comprising the steps of:  
decoding the Vertical Blanking Interval (VBI) data or private data channel information from said TV signal; and  
examining said data to determine the starting or ending indicators of a specific program.

10. The process of claim 1, further comprising the step of:  
scanning the words contained within the closed caption (CC) fields to determine program starting and ending times, wherein particular words or phrases are used to trigger the recording of a specific program and wherein the CC information is preserved in time synchronization with the audio and video, and can be correctly presented to the viewer when the stream is displayed; and  
performing a specific action when a specific word is found in said CC information.

11. The process of claim 1, wherein said Media Switch operates asynchronously and autonomously with a CPU and wherein said Media Switch allows the CPU to queue up Direct Memory Access (DMA) transfers.

12. The process of claim 1, further comprising the step of:  
providing a multimedia recording device, including, but not limited to, a Video Cassette Recorder (VCR) or a Digital Video Disk-Random Access Memory (DVD-RAM) device, wherein said recording device is attached to the output side of said decoder, allowing said user to record said TV output signals;  
wherein said user queues up programs from said disk to be stored on said recording device;  
wherein said user sets time schedules for said programs to be sent to said recording device;  
wherein title pages may be sent to said recording device before sending a program

to be stored on said recording device;

wherein a program that is longer in duration than a magnetic tape in said recording device allows, is sped up to fit within the desired time limit or has frames dropped from it to fit within the desired time limit; and

wherein the output of said recording device is routed to said input section, allowing said recording device to act as a storage back up system, said recording device accepts overflow storage, TV programs, software updates, or other data that are later retrieved and sent to said input section.

13. A process for the simultaneous storage and play back of multimedia data, comprising the steps of:

providing a physical data source, wherein said physical data source accepts broadcast data from an input device, parses video and audio data from said broadcast data, and temporarily stores said video and audio data;

providing a source object, wherein said source object extracts video and audio data from said physical data source;

providing a transform object, wherein said transform object stores and retrieves MPEG streams onto a storage device;

wherein said source object obtains a buffer from said transform object, said source object converts video data into MPEG streams and fills said buffer with said streams;

wherein said source object is automatically flow controlled by said transform object;

providing a sink object, wherein said sink object obtains MPEG stream buffers from said transform object and outputs said streams to a video and audio decoder;

wherein said decoder converts said streams into TV signals and sends said signals to a TV receiver;

wherein said sink object is automatically flow controlled by said transform object;

providing a control object, wherein said control object receives commands from a user, said commands control the flow of the broadcast data through the system; and

wherein said control object sends flow command events to said source, transform, and sink objects.

14. An apparatus for the simultaneous storage and play back of multimedia data, comprising:

a module for accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC;

a module for tuning said TV signals to a specific program;

a module for providing at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation;

a module for providing a Media Switch, wherein said Media Switch parses said MPEG stream, said MPEG stream is separated into its video and audio components;

a module for storing said video and audio components on a storage device;

a module for providing at least one Output Section, wherein said Output Section extracts said video and audio components from a storage device;

wherein said Output Section assembles said video and audio components into an MPEG stream;

wherein said Output Section sends said MPEG stream to a decoder;

wherein said decoder converts said MPEG stream into TV output signals;

wherein said decoder delivers said TV output signals to a TV receiver;

wherein the storing and extracting of said video and audio components from said storage device can be performed simultaneously; and

a module for accepting control commands from a user, wherein said control commands are sent through the system and affect the flow of said MPEG stream.

15. The apparatus of claim 14, wherein said Input Section directs said MPEG stream to the destination indicated by said control commands.

16. The apparatus of claim 14, wherein said Output Section extracts said video



and audio components from the storage device indicated by said control commands.

17. The apparatus of claim 14, further comprising:

a module for creating custom video output sequences, wherein said sequences are specified by a user or program control.

18. The apparatus of claim 14, wherein said Media Switch calculates time stamp values or extracts time stamp values from a digital TV stream and logically associates said time stamp values to said video and audio components.

19. The apparatus of claim 14, further comprising:

a module for placing said video component into a circular video buffer;  
a module for placing said audio component into a circular audio buffer;  
a module for posting an event in a circular event buffer, wherein said event contains an indication that a video or audio component was found and the location of said video or audio component in said circular video or audio buffer;  
a module for sending notice of said event posting;  
a module for receiving said notice;  
a module for retrieving said event posting from said event buffer;  
a module for indexing into the appropriate buffer indicated by the type and location information in said event buffer; and  
a module for generating a buffer containing the logical audio or video segments in order, including ancillary information, wherein each of said logical segments points to the appropriate circular buffer location where corresponding audio or video components have been placed.

20. The apparatus of claim 14, further comprising:

a module for increasing or decreasing the decoder system clock rate for fast playback, fast reverse playback, slow playback, or slow reverse.

21. The apparatus of claim 14, further comprising:  
a module for combining system audio cues and on-screen displays with said TV output signals.
22. The apparatus of claim 14, further comprising:  
a module for decoding the Vertical Blanking Interval (VBI) data or private data channel information from said TV signal; and  
a module for examining said data to determine the starting or ending indicators of a specific program.
23. The apparatus of claim 14, further comprising:  
a module for scanning the words contained within the closed caption (CC) fields to determine program starting and ending times, wherein particular words or phrases are used to trigger the recording of a specific program and wherein the CC information is preserved in time synchronization with the audio and video, and can be correctly presented to the viewer when the stream is displayed; and  
a module for performing a specific action when a specific word is found in said CC information.
24. The apparatus of claim 14, wherein said Media Switch operates asynchronously and autonomously with a CPU and wherein said Media Switch allows the CPU to queue up Direct Memory Access (DMA) transfers.
25. The apparatus of claim 14, further comprising:  
a multimedia recording device, including, but not limited to, a Video Cassette Recorder (VCR) or a Digital Video Disk-Random Access Memory (DVD-RAM) device, wherein said recording device is attached to the output side of said decoder, allowing said user to record said TV output signals;  
wherein said user queues up programs from said disk to be stored on said recording device;

wherein said user sets time schedules for said programs to be sent to said recording device;

wherein title pages may be sent to said recording device before sending a program to be stored on said recording device;

wherein a program that is longer in duration than a magnetic tape in said recording device allows, is sped up to fit within the desired time limit or has frames dropped from it to fit within the desired time limit; and

wherein the output of said recording device is routed to said input section, allowing said recording device to act as a storage back up system, said recording device accepts overflow storage, TV programs, software updates, or other data that are later retrieved and sent to said input section.

26. An apparatus for the simultaneous storage and play back of multimedia data, comprising:

a physical data source, wherein said physical data source accepts broadcast data from an input device, parses video and audio data from said broadcast data, and temporarily stores said video and audio data;

a source object, wherein said source object extracts video and audio data from said physical data source;

a transform object, wherein said transform object stores and retrieves MPEG streams onto a storage device;

wherein said source object obtains a buffer from said transform object, said source object converts video data into MPEG streams and fills said buffer with said streams;

wherein said source object is automatically flow controlled by said transform object;

a sink object, wherein said sink object obtains MPEG stream buffers from said transform object and outputs said streams to a video and audio decoder;

wherein said decoder converts said streams into TV signals and sends said signals to a TV receiver;

wherein said sink object is automatically flow controlled by said transform object;

a control object, wherein said control object receives commands from a user, said

commands control the flow of the broadcast data through the system; and  
wherein said control object sends flow command events to said source, transform,  
and sink objects.

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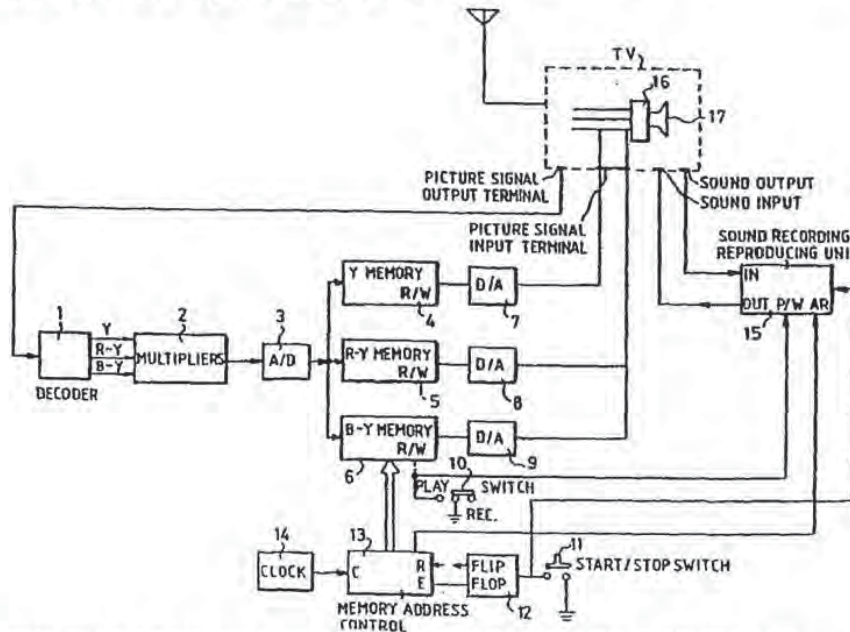
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(54) TV receiving device and method having repeating function

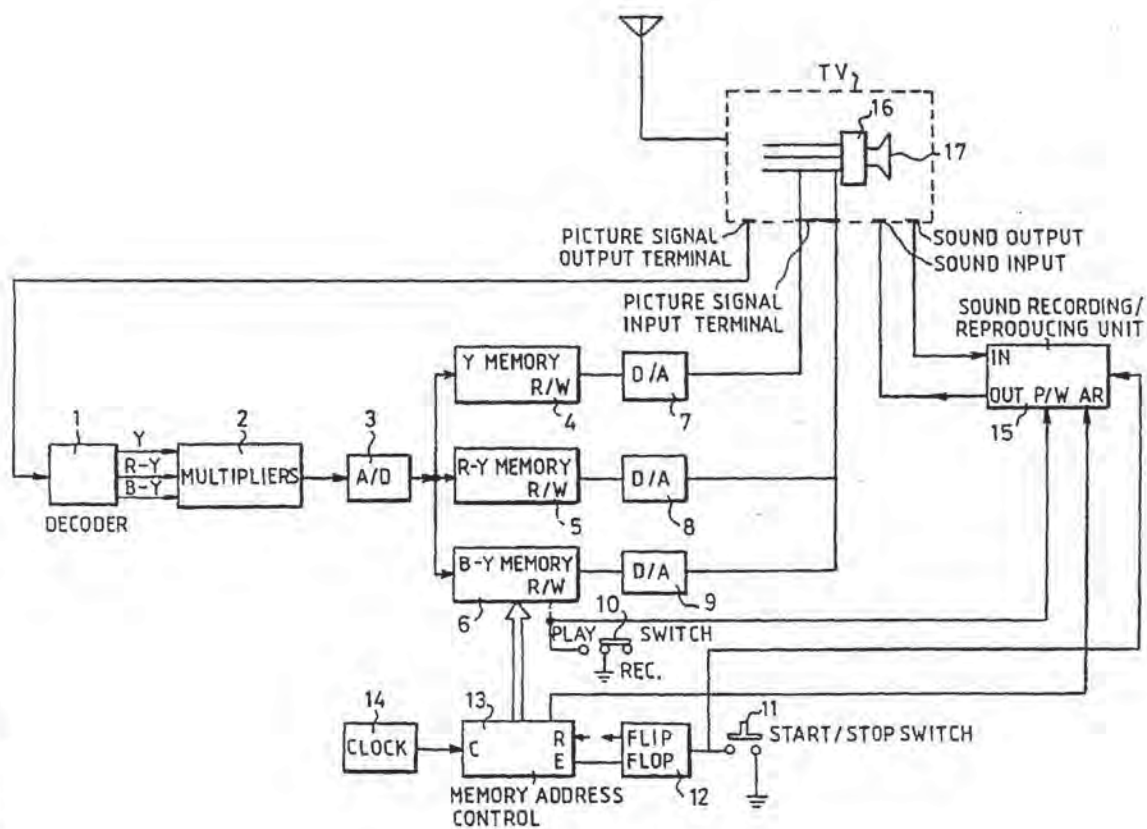
(57) A television receiver includes means permitting a scene to be reviewed instantly, inset into the main picture. Solid state memories 4, 5, 6 for colour components, and (not shown) for sound, record for example thirty seconds of broadcast which can be viewed by setting switch 10 to a play mode.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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TV RECEIVING DEVICE AND METHOD HAVING REPEATING FUNCTION

The present invention relates to a TV receiving device and method.

5 According to a conventional TV set, the viewer cannot watch a spot scene in detail and repeatedly while he is watching TV even if he has a desire to do so. This desire is partially satisfied by Japanese Patent Application No. S62-207775 belonging to the same applicant, wherein a video cassette tape recorder (VCR) is required.

10 If the viewer wants to watch once more or confirm a TV scene during the TV reviewing, there has been no means but using the well-known endless VCR to play back that scene at another time. This is seriously inconvenient for the viewer and it costs a great deal, so that there are a number of problems which cannot be accepted by the general viewer.

20 It is an object of the present invention to provide a TV receiving device and method having repeating function wherein if a viewer wants to watch once more or confirm a scene of the TV program which the viewer is now watching, the recording and reproducing operations of an IC which is operative simultaneously with the TV viewing are infinitely

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repeated for predetermined seconds and it is possible to reproduce a spot picture and sound at an instant which are recorded in the IC in a partial portion of a TV screen without interrupting a main picture and sound of the TV program when the viewer operates one button if he wants to watch again the spot pictures.

The above and other objects, features and advantages of the present invention will become more apparent from the following description when taken in conjunction with the accompanying drawing in which a preferred embodiment of the present invention is shown by way of illustrative example.

The single figure is a diagram showing the principle of the present invention.

The present invention will be described in the following in connection with its whole structure.

In the Figure, reference numeral 1 designates a decoder for extracting a brightness signal Y and color signals R-Y and B-Y from a picture signal coming from the picture signal output terminal of a TV receiver; numeral 2 designates a multiplexer for extracting the brightness signal Y and the color signals R-Y and B-Y alternately; numeral 3 designates an A/D converter for converting analog signals to digital signals; numerals 4, 5 and 6 designate memories for the brightness signal Y and the color signals R-Y and B-Y; numerals 7, 8 and 9 designate D/A converters for converting digital signals to analog signals; numeral 10 designates a changeover switch for switching the aforementioned three memories between the recording and playing modes;

numeral 11 designates a start/stop switch for starting or stopping the recording and playing modes; numeral 12 designates a binary flip-flop to be set and reset by the output of the switch 11; and numeral 13 designates  
5 s memory address control unit which is composed of a counter or the like for switching the addresses and frames of the aforementioned three memories. The memory address control unit 13 resets the reset signal R of the counter, when it reaches the maximum memory  
10 addresses and, OV, to return the counter output to 0 thereby to start the counter output from 0 so that the aforementioned memories can be endlessly used. Moreover, reference numeral 14 designates a sampling clock.

15 Next, the operations will be described in the following.

When a user wants to review again a scene of a TV program at an instant or a scene of several tens of seconds before, the start/stop switch 11 is depressed  
20 one time from the first. Then, the binary flip-flop 12 is set to activate the memory address control unit 13 with its output. Here, the switch 10 is switched to an REC side for the recording operation.

At this time, the counter memory address control  
25 unit 13 starts its counting operation from 0 by using the pulses coming from the clock 14 as its sampling frequency. This counted number designates the addresses of the aforementioned three memories 4, 5 and 6. The TV program transmits thirty frames per second.  
30 For this recording of thirty seconds, for example, memories of high capacity are necessary. If, on the other hand, the picture of a memory is to be displayed in a portion of the CRT, as described later, the picture signal can be cut and sampled more easily so

that the lower capacity of the memories can be sufficient.

Now, if the recording operations are continued, as described above, so that the memory address control unit designed to match the maximum capacity of the  
5      aforementioned memories is going to exceed the maximum counted number, the output comes out from the overflow terminal OV to reset the inside counters to drop the counted number to 0. Even if the counted number takes  
10     the value 0, the pulses continuously come in from the clock 14 so that the counter operations continue. As a result, the aforementioned three memories 4, 5 and 6 endlessly function.

If the switch 10 is switched to the reproduction  
15     PLAY side at a suitable timing, the three memories 4, 5 and 6 are switched from the writing state to the reading state for the reproducing operation. The picture is displayed, if it is cut to one third and sampled, in a 1/3 reduced picture simultaneously with  
20     the picture being received. The displayed position can be located in an arbitrary corner of the screen display, for example, by means of a remote control box of a digital TV receiver of a certain maker. This TV structure may be used.

25     In order to display the reproduced picture in the greatest portion of the CRT, on the other hand, high-speed memories are required with the sampling frequency of about 14 MHz. This can be realized because the memories per se are improved at present to have higher  
30     capacities and speeds by individual makers.

In the present invention, on the other hand, sound can be recorded and reproduced together with the picture simultaneously with the depression of the aforementioned start/stop switch by a sound

recording/reproducing unit 15 using memories (although not shown). The recording time is equal to the aforementioned one of the pictures, and the endless operations are executed by a similar structure.

5       The picture and sound recording operations thus far described can be endlessly accomplished for thirty seconds, for example. But this time can be shortened from the thirty second to an arbitrary period for the endless recording operations. For this, although not  
10       shown, there is prepared a preset counter (which will be referred to as a "second counter") having the same maximum counted number as that of the foregoing counter. While the not-shown switch (which will be referred to as a "second switch") is being depressed,  
15       the picture recording is continued by the Y memory 4, the R-Y memory 5 and the B-Y memory 6. During this recording operation, the counting operations of the counter in the memory address control unit 13 proceed, as described hereinbefore, and the counted value of  
20       this counter is preset and stored in the second counter. In other words, the maximum counted number at this time is stored. If the picture recording operation is to be ended for three seconds, for example, the operation is automatically switched to the  
25       reproducing operation by releasing the depression of the second switch. This reproduction is started from the counted number 0 of the counter in the memory control unit 13. If the reproduction reaches the aforementioned three seconds so that coincidence  
30       between the counted number of the counter of the memory address control unit 13 and the maximum counted number stored in the second counter is detected by a comparator (although not shown), the same picture is repeatedly reproduced after the counter of the memory

address control unit 13 is returned to the counted number 0. That is to say, the picture image is endlessly reproduced for three seconds. Another structure can be made so that the start/stop switch 11 is depressed to stop the repeating operations.

The same means is used for the sound.

If a portion of the picture, i.e., the portion of three seconds is to be endlessly reviewed during the endless reproduction of the picture of thirty seconds, the endless picture of three seconds can be reviewed in a portion of the main picture being projected, in place of the aforementioned endless picture of thirty seconds so that a convenient method can be provided for confirming the instant operation.

If, moreover, the aforementioned endless reproduction is ended to switch the switch 10 to the REC side, the memories 4, 5 and 6 are brought into their writable states so that their outputs to the D/A converters 7, 8 and 9 disappear. As a result, the reduced picture displayed in the corner of the CRT disappears to leave only the first picture broadcast and displayed.

The aforementioned operations will be described in detail in the following. In the operation described above the recording/reproducing operations could be endlessly accomplished for the maximum time of thirty seconds, for example, and the memories are partially used to accomplish the endless recording/reproducing operations for three seconds. The remaining twenty three seconds could not be efficient for making effective use of the memories.

As means for solving this problem, the picture can be recorded fully in the memories of thirty seconds, and the range of the portion which the user wants to

watch can be designated so that it may be endlessly reviewed, as will be described in the following. For this, the switch (although not shown) is continuously depressed while the picture to be reviewed is displayed. The (start) addresses of the memories 4, 5 and 6 at the start of the depression of the switch are stored in the memory address control unit 13, and the (end) addresses of the memories 4, 5 and 6 at the release of the switch depression are likewise stored in the memory address control unit 13 so that the picture to be reviewed between the start addresses and the end addresses can be endlessly reproduced.

Incidentally, the time interval after the picture to be reviewed is displayed before the aforementioned switch is depressed may possibly be delayed. The aforementioned start addresses can be subtracted by two or three seconds in the memory address control unit 13 so that the picture two or three seconds before the start of the switch depression can be reproduced.

If the user wants to watch the endless picture of a subsequent instant scene after the instant endless observation of the desired picture, the aforementioned switch is depressed at the end of the preceding picture to designate the range of the subsequent endless reproduction. Thus, the subsequent picture can be endlessly reviewed. In any event, if only the main picture is to be returned to the broadcasted picture after the reviewing of the endless picture, the switch 10 is switched to the REC side, as has been described hereinbefore, so that the endless picture disappears to leave only the first picture.

As has been described hereinbefore, according to the present invention, the recording and reproducing operations of a predetermined short time, i.e., several

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to several tens of seconds are infinitally accomplished in the IC circuit which is separately built in the TV receiver, during the reviewing of the TV program. If the user wants to repeatedly watch or confirm that portion during the TV reviewing, its picture and sound can be reproduced in a portion of the TV screen by operating one switch. In this manner, the main picture can be reproduced partially or mostly in the TV screen without any interruption. Thus, the present invention can improve the practical value remarkably as the TV receiver.

Although a certain preferred embodiment has been shown and described, it should be understood that many changes and modifications may be made therein without departing from the scope of the invention.

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Claims

1. A TV receiving device having repeating function, comprising;

means for endlessly and infinitely repeating the short-time video/audio recording operation of an IC having a predetermined capacity for t1 seconds while a viewer is watching a main TV picture;

means for making a circuit operative, said circuit for repeatedly reproducing a side picture and sound which are video/audio recorded endlessly for t1 seconds into said IC if the viewer pushes a switch SW-1 when he wants to watch in detail an instant spot during the viewing of the main picture;

means for reproducing said side picture in a most or partial portion of a TV screen;

means for continuing the displaying of the main picture in the partial or most portion of the TV screen without any interruption even during the reproduction of said side picture; and

whereby the reproduction of the endless side picture of said IC is stopped when the viewer pushes said SW-1 again, so as to view continuously only said main picture and back to original state.

2. A TV receiving device having repeating function, according to claim 1, wherein said reviewed main picture and sound are live on the air.

3. A TV receiving device having repeating function, according to claim 1, wherein said reviewed main picture and sound are reproduced one from a video cassette tape recorder.

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4. A TV receiving device having repeating function, according to claim 1, wherein said reviewed main picture and sound are endlessly recorded and reproduced one.

5

5. A TV receiving device having repeating functions, according to claim 1, wherein the location and percentage of the screen occupied by said picture image can be varied remotely or manually.

10

6. A TV receiving method having repeating function, comprising;

means for endlessly and infinitely repeating the short-time video/audio recording operation of an IC having a predetermined capacity while a viewer is watching a TV image;

means for reproducing a picture and sound endlessly recorded into said IC for a short time if the viewer pushes a separate predetermined switch when he wants to watch in detail on instant spot once again during the TV viewing;

means for reproducing said endless picture in a most or partial portion of a TV screen;

means for continuing the reproduction of the TV picture being reviewed in the partial or most portion of the TV screen without any interruption even during the reproduction of said endless picture and sound; and

means for eliminating an obstruction of overlapping sound by cutting one of the sounds of said main or side picture when said pictures are displayed on a same CRT tube.

7. A TV receiving device substantially as hereinbefore described with reference to the accompanying drawing.

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8. A TV receiving method substantially as hereinbefore described.

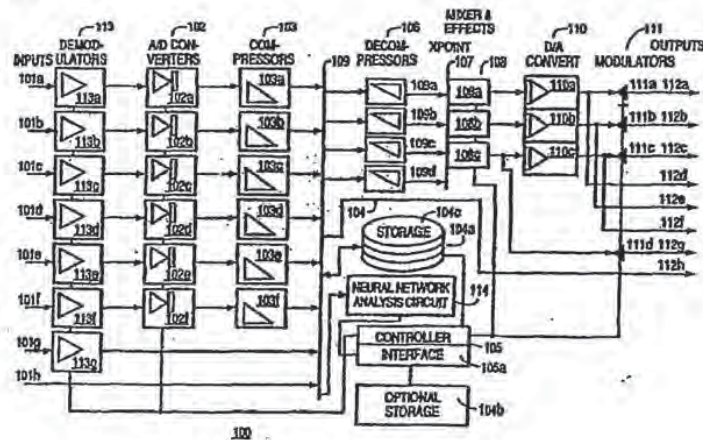
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(54) Title: LARGE CAPACITY, RANDOM ACCESS, MULTI-SOURCE RECORDER PLAYER



(57) Abstract

An audio/video recorder system receives a plurality of transmission signals each containing program information and simultaneously stores the received transmission signals. The system can be controlled by user input to allow for automatic recording of selected programs simultaneously input from multiple sources, reconfiguration of stored programs, and routing of stored programs to selected outputs.

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LARGE CAPACITY, RANDOM ACCESS,  
MULTI-SOURCE RECORDER PLAYER

Background of the Present Invention

The present invention relates generally to a large capacity, random access, multi-source audio and video recorder player which is capable of receiving a plurality of simultaneous input signals and which allows a user to view and/or to record selected ones of the plurality of input signals.

Currently, television viewers for the most part have little flexibility with regard to when broadcast programming may be viewed. The broadcaster's schedule is the user's schedule. The video cassette recorder (VCR) is the only device which allows a user to control the recording of programs and the time of viewing programs, by replaying recorded programs. The VCR allows the user to pre-set recording for a specific program by selecting the specific date, time, and channel that the program is broadcast. Such features allow the user to record without being present and to replay the recorded material at another time.

However, current VCRs have limited storage capacity and only single source capability and therefore do not provide the user with a great degree of flexibility and control over program recording. Moreover, conventional VCRs require constant attention for selection and recording of each program. Furthermore, a conventional VCR can only record one program at a time, while a typical household can receive many programs from multiple sources simultaneously.

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It is therefore an object of the present invention to provide large capacity multiple source recording with random access, thus affording the user greater flexibility and control over the recording and replaying of programs.

It is a further object of the present invention to provide a large capacity recorder player which allows continuous recording of a program with automatic erasure, such that the material recorded first is automatically erased first when the multi-source recorder player storage reaches capacity. This feature greatly reduces the need for constant user attention and provides multiple viewing options.

Another object of the present invention is to allow the user to record from multiple channels individually, serially, or simultaneously.

Another object of the present invention is to allow the user to view programs while simultaneously recording one or more other programs.

Yet another object of the present invention is to provide a multi-source recorder player whereby the user can modify stored programs.

Another object of the present invention is to allow the user to record from multiple channels and from multiple distribution sources simultaneously.

Still another object of the present invention is to allow the recorder to adapt to the viewing habits of the user by analyzing selected criteria.

A further object of the present invention is to record material continuously to allow random retention of chosen program segments.

Yet another object of the present invention is to permit the user to mix multiple stored programs into a composite form.

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Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

#### Summary of the Invention

To achieve the objects in accordance with the purposes of the present invention, as embodied and described herein, the audio/video recorder system of the present invention comprises input port means for receiving a plurality of transmission signals each containing program information, and storage means, coupled to the input port means, for simultaneously storing the plurality of received transmission signals.

The present invention further comprises an audio/video recorder system comprising input port means for receiving a plurality of transmission signals each containing program information; storage processing means, coupled to the input port means, for storing the program information in the plurality of received transmission signals; and playback means, coupled to the storage means, for retrieving and playing desired program information from the stored received transmission signals, for playing program information simultaneously with the storing of program information by the storage processing means, and for playing different program information simultaneously.

The present invention further comprises an audio/video recording device for simultaneously storing information from a plurality of sources, the recorder comprising input

port means for receiving a plurality of transmission signals, and storage means, coupled to the input port means, for simultaneously storing the received transmission signals.

The present invention additionally comprises an audio/video routing device comprising input port means for receiving a plurality of transmission signals; demodulator and a/d conversion means, coupled to the input port means, for transforming the received transmission signals into digital signals each corresponding to a different one of the received transmission signals; and routing means for controlling the forwarding of the digital signals.

Brief Description of the Drawings

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate the presently preferred apparatus and method of the invention and, together with the general description given above and the detailed description of the preferred embodiment given below, serve to explain the principles of the invention. In the drawings:

Fig. 1 is a block diagram of a preferred embodiment of the multi-source recorder player of the present invention;

Fig. 2 is a diagram of the main menu control screen of the user control section of the multi-source recorder player;

Fig. 3 is a diagram of the setup page screen option selected from the main menu control screen;

Figs. 4A-4C are diagrams illustrating the calendar screen option selected from the main menu control screen;

Figs. 5A-5E are diagrams illustrating the program selection option screen selected from the main menu control screen;

Fig. 6 is a diagram of the stored program list option screen selected from the main menu control screen;

Fig. 7 is a diagram of the routing controller option selected from the main menu control screen;

Fig. 8 is a diagram of the special effects screen option selected from the main menu control screen;

Fig. 9 is a diagram of the mix control screen selected from the special effects screen;

Fig. 10 is a diagram of the wipe control screen selected from the special effects screen;

Fig. 11 is a diagram of the database access option selected from the main menu control screen;

Fig. 12 is a block diagram of a preferred voice control system of the present invention;

Fig. 13 is a flowchart of a preferred method of recording of the present invention; and

Fig. 14 is a drawing of the remote control panel of the present invention.

#### Detailed Description of the Preferred Embodiments

Reference will now be made in detail to the construction and operation of preferred embodiments of the present invention which are illustrated in the accompanying drawings. In those drawings, like elements and operations are designated with the same reference characters.

In the following description, the preferred embodiments described are examples of the present invention. The present invention, however, is not limited to these examples, but may be realized in other embodiments.

Fig. 1 is a block diagram of a preferred embodiment of the multi-source recorder player 100 of the present invention. With the multi-source recorder player 100, a plurality of programs, consisting of audio and/or video signals, may be received simultaneously from a plurality of sources.

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The multi-source recorder player 100 preferably has multiple input connections, each of which may receive an input signal 101a-101f from air and ground based broadcast sources, cable feeds, or digital distribution sources. Further, the multi-source recorder player 100 can preferably receive and process compressed digital signals 101g and 101h. Receiving compressed signals expands the signal handling and storage capacity of the multi-source recorder player 100. Once signals are input, the multi-source recorder player 100 can simultaneously record, process, route, and display the plurality of input video and/or audio signals.

The multi-source recorder player 100 preferably includes enough storage such that twenty or more hours of video with audio programming may be stored in a storage section 104. If audio only or video only programming is being retained, the storage times will increase correspondingly. The storage of audio and video only programming will utilize less storage than combined video and audio programming. The number of hours of recording which may be recorded, however, is not critical to this invention. To output the recorded programs, the multi-source recorder player 100 preferably includes a plurality of output connections including multiple rf, and digital and analog video and audio for outputting output signals 112a-112h to receiving devices, such as televisions and video recorders. Additionally, some of the output signals 112a-112h may include control signals for recording and viewing control of external devices. These devices will be controlled by controller 105 via the corresponding output connection. Setup for the control output is achieved from the output setup section 302 of the setup page control screen 300.

The multi-source recorder player 100 also preferably includes routing and compositing abilities affording a user control over the form and the destinations of the input signals 101a-101h. The multi-source recorder player 100 may optionally include signal analysis circuitry, preferably in the form of a neural network analysis circuit 114, for assisting the viewer in storing and retrieving desired programs and portions of desired programs.

Users of the multi-source recorder player 100 optionally have selectively filtered programming because a plurality of programs are received simultaneously, buffered in a temporary program FIFO buffer 104c, and scanned and selectively stored by the neural network analysis circuit 114. The system preferably filters the incoming programming by scanning the input programs on bus 109, overwriting undesired programs, and retaining only desired programs. Such a feature is particularly useful in this era of increased channel capacity from cable, satellite, and digital distribution channels.

Additionally, a portion of the storage section 104 of the multi-source recorder player 100 can be cycled. Memory is cycled when the multi-source recorder player 100 is set to operate a FIFO buffer for auto recording storage allocation 104c in the storage section 104. The auto recording storage allocation FIFO buffer 104c temporarily caches programs from a selection of channels on a FIFO basis and preferably retains certain of those programs as selected by the user, or as selected by the user's viewing patterns recognized by neural network analysis circuit 114. After user or neural network selection, the program is retained by being added to the stored program list 600. In this way data is retained by multi-source recorder-player into storage section 104. The memory is cycled because the FIFO

buffer 104c causes only selected desired programming to be stored in storage section 104 and listed in the stored program list 500. Preferably, all unchosen programs are overwritten by the next auto recording storage allocation FIFO pass.

Programs are not actually moved from the FIFO buffer 104c to storage section 104 but rather the reference to them is added to the stored program list 500. The user or neural network decision determines the program starting point. When the first program buffered in the storage section 104 has been either stored or discarded, the next program becomes the first program. Additionally, programs may be erased from storage section 104 and new programs added from the FIFO buffer 104c.

With auto-recording storage allocation enabled, the selection of a program for storage listing and retention can be performed some time after the programs or portions of the programs are received. For example, a user can select a program for storage listing and retention after viewing the program, or the choice can be made while the program is being viewed. Alternatively, selection can be made automatically by the neural network analysis circuit 114.

The multi-source recorder player 100 can also preferably access databases of compressed and non-compressed audio and video data. The multi-source recorder player 100 can access databases through one or more of the input ports. For example, controller 105 can operate a communication session with a remote computer via signal path 101g of the multi-source recorder player 100. The remote computer can be connected via an ISDN network connection, for example. The selected remote program data can be input to the multi-source recorder player 100 and stored in the

storage section 104. This transfer process can preferably occur concurrently with other activities in the multi-source recorder player 100.

In a preferred embodiment of the present invention, the multi-source recorder player 100 preferably includes input demodulator section 113. In the preferred embodiment, input demodulator section 113 includes a plurality of input demodulators 113a-113g. The number of input demodulators 113a-113g corresponds directly to the number of modulated input signals 101a-101g which are received by the multi-source recorder player 100 and which may be simultaneously demodulated. The number of input demodulators 113a-113g may vary but there should be at least two. The input demodulators 113a-113g are preferably chosen to receive signals from one or more of the following: a VHF antenna input, an FM antenna input, an AM antenna input, a cable television input, a Direct Broadcast Satellite input, a digital signal input, and an audio and video direct input.

The input demodulators 113a-113g demodulate signals from the following sources: VHF TV broadcasting, UHF TV broadcasting, FM radio broadcasting, AM radio broadcasting, cable television, satellite broadcasting, ISDN or other digital distribution sources and a VCR or audio recorder. Moreover, of the plurality of input demodulators 113a-113g, more than one may preferably receive the same type of signal. Thus, for example, a plurality of cable television input signals may be received simultaneously by the multi-source recorder player 100.

Each of the plurality of input demodulators 113a-113g respectively receives an input signal 101a-101g comprising audio and/or video information. The signals are received

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via an input connector located on the rear of the multi-source recorder player 100. Input signals 101a-101g are demodulated separately by each of the plurality of demodulators 113a-113g. After demodulation by input demodulators 113a-113g, the audio and video signals are separately converted to digital signals by analog to digital (a/d) conversion section 102. Conversion section 102 preferably comprises a plurality of a/d converters 102a-102f. In the preferred embodiment shown in Fig. 1, input signals 101a-101f are analog signals. Therefore, there is one a/d converter 102a-102f for each simultaneously viewable and recordable analog input signal 101a-101f.

Once the signals are a/d converted, they are passed to digital compression section 103 for data reduction. Digital compression section 103 preferably includes a plurality of compressors 103a-103f. There is one compressor 103a-103f for each non-compressed input signal 101a-101f which may be input to the multi-source recorder player 100. Compression may be performed simultaneously in each of the compressors 103a-103f. The data quantities in the converted signals are preferably reduced by a factor of approximately 200 for video signals, and a by factor of approximately 8 for audio signals. Compression performed by compressors 103a-103f increases the storage capacity and the signal handling capacity of the multi-source recorder player 100. By routing and storing signals in their compressed form, the multi-source recorder player 100 can store and distribute large quantities of programming simultaneously.

Once compressed in compression section 103, the data is preferably input to storage section 104 via bus 109. The storage section 104 preferably employs high speed,

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large capacity random access devices which may include optical and magnetic disks, RAM memory, and very high density floppy disks. The storage section 104 may also be configured to include a primary storage section 104a, and an optional storage section 104b, which may be connected to the multi-source recorder player 100 via a high speed digital connection using interface 105a. The optional storage section 104b may include removable media for long term storage of compressed data. With optional storage section 104b, users have control over the total amount of "on-line" storage capacity of the multi-source recorder player 100.

Alternatively, certain input signals, such as signals 101g and 101h, may be pre-compressed. For example, the multi-source recorder player 100 may receive digital ISDN data as input signal 101g, which is digitally modulated and distributed in a compressed format. The input signal 101g is passed directly to the demodulator section 113 and bypasses the converter section 102 and compression section 103. Multi-source recorder player 100 may also receive demodulated compressed data as input signal 101h, which is passed directly to storage section 104.

It is desirable to permit direct storage of pre-compressed data because compressed program distribution is becoming more common. Compression is especially desired when distributing high information content signals such as high definition television (HDTV) signals and improved definition television (IDTV).

Once an input signal reaches bus 109, certain predetermined criteria of the input signal may be assessed, if this option is chosen. Analysis is controlled by the user and will be discussed in greater detail below with respect to the user control section, shown and described with respect to Figs. 2-11. Such analysis is preferably performed

by a neural network analysis circuit 114. The neural network analysis circuit 114 is connected by the bus 109 and the controller 105. The controller 105 selects which of the input signals 101a-101h are input to the neural network analysis circuit 114. With this configuration the neural network analysis circuit 114 may scan one or more of the input signals 101a-101h.

The neural network analysis circuit 114 is designed to "learn" the user's preferences for programs by analyzing the user's viewing patterns. Neural network analysis circuit 114 operates recognition processing operations on the compressed data output from compressors 103a-103f and is configured to recognize program segments of interest to users of the multi-source recorder player 100. To do so, a user, by viewing program segments, automatically "teaches" the neural network analysis circuit 114 program elements which are of interest to that user.

Additionally, a user may manually assist the neural network "learning" by selecting the "interesting" button 1411 or "uninteresting" button 1412 on the remote control panel 1400, shown in Fig. 14. The "interesting" button 1411 and "uninteresting" button 1412 aid the neural network analysis circuit 114 in quickly learning the viewing interests of a user. If the neural network analysis circuit 114 finds programming with patterns of interest to the user, the programming will be stored in storage section 104 for future playback. Thus, with the neural network analysis circuit 114, the user can maximize the storage capacity of storage section 104 by teaching the multi-source recorder player 100 which programs are of interest and which are not of interest so that only programs of interest are automatically retained for future viewing and scanning.

Further, with automated recording, described below with respect to the user control section in Figs. 2-11, the neural network analysis circuit 114 can use the learned criteria to scan any number of channels and to retain any program which meets the learned criteria. This capability, combined with continuous FIFO buffering of incoming programming in FIFO buffer 104c, allows for retention of programs analyzed to be of interest after analysis is performed. The analysis performed by the neural network analysis circuit is optional.

Program viewing typically involves retrieving a program stored in the storage section 104 and/or viewing an incoming program from sources 101a-101h. The user of the multi-source recorder player 100 communicates with controller 105 in order to control the multi-source recorder player 100 and to retrieve data, stored as programs, in storage section 104.

Controller 105 is a microprocessor which preferably runs a user control program and allows a user to access and control the multi-source recorder player 100. The user control section, which is described in greater detail with respect to Figs. 2-11, preferably acts similarly to the graphical interface provided by the Windows product sold by Microsoft, Inc. Selections are made via a remote control with a cursor positioning device such as a mouse or trackball.

The controller 105 generates a virtual control screen which may be placed on any screen to control of any one or more playback or recording processes. If a user wishes to view programs on several monitors simultaneously, the controller 105 can either operate multiple virtual control screens, one or more for each output monitor, or for each program window. Alternatively, the user may control all



screens from one controller, portions of which may be dragged between screens, such as in an Apple Macintosh computer with multiple screens. The user control program preferably includes a stored program list, shown in Fig. 6. The stored program list contains an index of programs stored in storage section 104, and held in the memory of the controller 105. The controller 105 can thereby address a desired program and output it to decompression section 106.

Decompression section 106 preferably comprises a plurality of decompressors 106a-106d wherein one of the decompressors 106a-106d decompresses a selected stored program. Storage section 104 can output a plurality of programs stored therein simultaneously, each to a respective one of decompressors 106a-106d. The number of decompressors corresponds to the number of simultaneously viewable programs. With four decompressors 106a-106d, it is possible to view four simultaneous programs at one or more of the outputs 112a-112h.

The decompressed data from decompressors 106a-106d is input to the digital crosspoint 107. The digital crosspoint 107 comprises a high speed data bus with decoding logic allowing any source to be connected to any destination. The digital crosspoint 107 routes the decompressed digital data to the mixing and effects processing section 108.

Mixing and effects processing section 108 preferably contains high speed video and audio processors which perform digital signal processing. Fig. 1 shows three separate processors 108a-108c corresponding to three possible separate output signals simultaneously available. Processors 108a-108c may preferably operate on one or more signals. The mixing and effects processing section 108 allows

a plurality of input signals to be added, subtracted, dissolved, faded, zoomed, windowed, panned, tilted, and swept, for example. The mixing and effects processing performed in the mixing and effects processing section 108 is controlled by the user and will be discussed in greater detail below with respect to the user control section.

After data is processed in the mixing and effects processing section 108, the data is output to d/a converter section 110. The d/a converter section 110 preferably comprises d/a converters 110a-110c. The d/a converters 110a-110c preferably include audio and video converters and buffering amplifiers which follow the converters and are used for driving the modulators.

After d/a converting, the data is sent to modulation section 111. The modulation section 111 preferably includes modulators 111a-111d. Although Fig. 1 shows four modulators, there is preferably one modulator for each modulated output signal.

After modulation in the modulation section 111, signals may be output to various receivers. The multi-source recorder player 100 preferably has a plurality of outputs, shown as 112a-112h in Fig. 1. With multiple outputs 112a-112h, different users can be playing the same program from the multi-source recorder player 100 at different receivers. Multiple outputs also make it possible to off-load one program to a VCR, while other programs stored in storage section 104 are being scanned.

Each of outputs 112a-112h preferably includes a separate audio and video output. In Fig. 1, the multi-source recorder player 100 may have eight video and eight stereo audio outputs. In the preferred embodiment of the invention shown in Fig. 1, outputs 112a-112h preferably include analog baseband modulated and rf modulated outputs. Output

112a is a rf modulated version of the same signal available at output 112d as a baseband signal, and baseband outputs 112b and 112c correspond to rf modulated outputs 112e and 112f, respectively, as shown in Fig. 1. There are two digital outputs 112g and 112h. Output 112g may be used for sending decompressed digital data, for example, to a digital television receiver. Output 112h may be used to output modulated or non-modulated compressed program data, for example, to a remote location via common carrier channels, such as the telephone or ISDN networks, or to any receiver with decompression circuitry. The three primary outputs include external device control connectors and signals, thus allowing controller 105 to control external devices such as VCRs.

Of the three analog outputs, output 112a may be set by default in the setup page 300, shown in Fig. 3, to receive the control screens which are described below with respect to the user control section shown in Figs. 2-11. Control screens are used to set the desired functions of the multi-source recorder player 100. The remaining analog outputs, output 112b and output 112c, may be set in the setup page 300 to receive programs from storage section 104 without overlapping control screens. Output 112a may preferably be sent to a primary monitor device, and outputs 112b and 112c are preferably connected to one or more audio/video recorders or secondary monitors. The control screen output may be changed by the user to output 112b or 112c.

Each video output from outputs 112a-112h is capable of outputting multiple programs simultaneously. In order to output multiple programs simultaneously, the user selects the format of the output. The output format is controlled by controller 105 and is performed in the mixing and effects processing section 108. For example, a plurality

of programs may be output on output 112a in tiled or overlapping windows. Alternatively, multiple programs may be mixed into a composite image in the mixing and effects processing section 108 and output on a single output. The format of the output data is selected in the setup page 300, described with respect to Fig. 3.

Audio program data is handled in much the same way as video program data, except that effects, such as wipe and zoom, cannot be performed on audio data. However, the user can control the output of audio data via controller 105 in the mixing and effects processing section 108. Such control allows the user to perform audio fades, mixing, and routing. Voice control signals, also described below with respect to the user control section, may also be mixed with the audio data and output by default to output 112a.

In another embodiment of the present invention, the plurality of outputs 112a-112c of the multi-source recorder player 100 can each be connected to multiple televisions. With multiple televisions connected, it is possible to view several input programs at one or more locations simultaneously. The outputs 112a-112c of the multi-source recorder player 100 may also be used to send incoming programs to one or more destinations. The multi-source recorder player 100 can then be used for multi-user program distribution applications. In a multi-user application, multiple controllers 105 preferably respond to and interact with several users simultaneously via multiple control screens. Moreover, in an embodiment of the present invention which does not include storage section 104, the multi-source recorder play 100 can be used as a router and controller of the input signals and external recorders.

As indicated above, the multi-source recorder player 100 is controlled by controller 105. Preferably, controller 105 is accessed by the user from the control screen output on output 112a and the remote control panel 1400 shown in Fig. 14. Figs. 2-11 are sample control screens used to control the multi-source recorder player 100. The user control section is available to the user as an option and makes it possible for a user of the multi-source recorder player 100 to select program source, channel, recording time, erasure, and output settings. If the user control screens shown in Figs. 2-11 are not desired, the user can operate the multi-source recorder player 100 with buttons, not shown, as in a conventional VCR.

Fig. 2 is a diagram illustrating a main menu control screen 200. Control screen 200 will preferably appear on at least a portion of the output monitor screen of the user, which may be attached to output 112a, when the user wants to implement a function of the multi-source recorder player 100. The user can preferably choose from a plurality of options appearing on the main menu control screen 200 including program recording option 202, stored program list option 203, database access option 206, routing control option 204, special effects option 205, and setup page option 201. User choice of the available options may be performed by an on-screen display with auditory prompts, a wired or wireless controller with a cursor positioning device, track ball, a voice sampler, or a plurality of front panel switches.

When the user selects the setup page option 201 from the main menu control screen 200, setup page screen 300, shown in Fig. 3, appears. The setup page screen 300 allows the user a plurality of control options including selection of program erasure section 301. Program erasure section

301 allows a user to set how stored programs will be saved in the storage section 104. Preferably, programs are handled as continuous blocks of sequentially received data, for example, a one hour block of time or a ten-second block of time.

Programs may be stored in storage section 104 and erased when storage capacity is reached in a first-in/first-out (FIFO) mode, if selection of FIFO option 301a is made from program erasure section 301. In the FIFO mode, if additional storage is required, then the oldest available program in storage section 104 is erased and a new program is stored in this storage space. If the locking option described below is selected, and if the oldest stored program is locked, the next oldest unlocked program is preferably overwritten when recording occurs. Thus, the FIFO mode causes the oldest stored program, or oldest stored unlocked program, to be automatically erased when the storage capacity of storage section 104 is reached.

Alternatively, program erasure may be selected by choosing erasure section 301. By selecting previously viewed option 301b, only programs which have been viewed will be automatically erased. The erasure of the stored viewed programs will preferably be performed on a FIFO basis. Thus, having selected this option, unviewed programs are automatically saved. And, alternatively, program erasure may be set in program erasure section 301 to be executed only at the command of the user by selecting the command erasure option 301c. In this mode, automatic erasure will not occur at all, and programs will only be erased at the command of the user.

Setup page screen 300 also preferably includes output setup section 302. Output setup section 302 allows the user to connect selected outputs, for example, outputs

112a-112c shown in Fig. 1, to a desired receiving device. For example, as shown in Fig. 3, output 112a may be connected to a television 312, output 112b may be connected to a VCR 322, and output 112c may be connected to a third control device 332. The setting determines the control protocol. The user can thus send control signals for devices along with the programs to the receiving devices. This allows controller 104 to control the connected receiving device. Control signals are useful, for example, when choosing to download programs to remote video recorders. With control signals as well as video and audio signals available at each output, it is possible to automate the offloading of programs to an external VCR or other recording device. Output setup section 302 makes it possible to connect and control many different video and audio recorders.

Setup page screen 300 also preferably includes set recording criteria section 303. This allows the user to control the neural network analysis circuit 114. With selection of monitor viewer option 303a, the neural network analysis circuit 114 will learn desired programs from the viewing patterns of the user. With watch selection of buttons option 303b, the neural network analysis circuit 114 will be trained from "interesting" button 1411 and "uninteresting" button 1412 on the control panel 1400. With off selection option 303c, the neural network analysis network 114 will be disabled.

The auto recording storage allocation section 305 of setup page 300 allows the user to allocate a fixed portion of storage 104 for continuous FIFO buffering, as described above. The portion of storage allocated is designated as a percentage of all storage available in storage section 104.

and as shown in bar 305a. The storage allocation section 305 also preferably displays the allocation numerically at 305b.

Setup page screen 300 also preferably includes display mode section 304. The display mode section 304 allows outputs 112a-112c to display multiple programs on one screen and also to display identical programs in different ways. If window option 304a is selected, the user can cause the output of selected ones of the outputs 112a-112c to be windowed. That is, the user can send a signal from one of the outputs 112a-112h to a receiver such that it appears as a window in another signal output to that receiver. Alternatively, the user can choose tiled windows, where the output appears as a series of equally sized windows, by selection of the tile window option 304b. Finally, the user can simply choose the full screen mode with the full screen option 304c.

As an example, after making a selection, output 112a can preferably output a single program on a full screen in a non-windowed mode. Output 112b could output the same program in a window located at the top left of the screen of the connected output device with selection of the window option 304a for output 112b. Output 112c could output four programs in four tiled, adjoining windows if the tile window option 304b is selected for this output.

The overlapping windows selected by window option 304a and the tiled windows selected by tile window option 304b can preferably be dynamically moved with the aid of a menu bar. Location of such a menu bar and control of the tiled or overlapping windows is preferably accomplished by the



mixer and effects processing section 108. If the user activates the display mode option 304, the mixer and effects processing section 108 causes an overlap of a control window on top of the displayed program screen.

After the user selects the setup criteria from the setup page screen 300, the multi-source recorder player 100 can be set to record. To record desired programs, the user selects the program recording option 202 from the main menu control screen 200 shown in Fig. 2. After selection of program recording option 202, a Gregorian calendar screen 400, illustrated in Figs. 4A-4C, appears on the screen. The calendar screen 400 is used to set the record-time of a desired program.

The Gregorian calendar screen 400 includes a month screen 401 shown in Fig. 4A. The month screen 401 includes each month of the year. After the user selects the desired month, such as June, as shown in Fig. 4A, the date screen 402, shown in Fig. 4B, appears. The user then selects the desired date, shown in Fig. 4B as June 5. The time screen 403, shown in Fig. 4C, then appears and the user selects the time when the multi-source recorder player 100 should be set to record.

The series of calendar screens shown in Figs. 4A-4C, like the other control screens, is generated on screen by controller 105 and is mixed at the crosspoint 107 and mixer and effects processing section 108. The calendar is displayed on the control screen which preferably appears as a floating window on the selected output. Controller 105 retains data entered into the calendar program, from screens 4A-4C, in RAM memory for future control of the multi-source recorder player 100.

After the user sets the time of recording, he or she preferably next selects what is to be recorded. Figs. 5A-5E show the control screens which appear on the output screen for selection of the program to be recorded.

Fig. 5A shows the enter channel screen 501 which prompts the user to enter the channel of the program to be recorded. Upon entering the channel, the user is prompted from source screen 502, shown in Fig. 5B, to enter the source from which the multi-source recorder player 100 should record the desired program. The user can select from, for example, cable, VHF antenna, UHF antenna, FM radio, AM radio, satellite, DBS, or ISDN digital from source screen 502. Next, frequency and title screen 507 appears as shown in Fig. 5C. From this screen, the user can optionally enter the program title into the title section 503. Although the source and channel comprise sufficient data for specifying a specific program to be recorded, the user may optionally enter the program title at this time.

Following the optional entry of the program name, the user can preferably enter the recording frequency from the recording frequency section 504, shown in Fig. 5D. The user can select from, for example, hourly, daily, weekly, bi-weekly, monthly, or other recording frequencies from frequency section 504. For example, if the user selects daily recording, the multi-source recorder player 100 will record the program which airs at the time and date selected in Figs. 4A-4C every day from the selected channel until it is programmed to stop recording. The "other" recording option will allow for recording special events on specific dates, for example.

Alternatively, if program codes representing the program, the source, or the recording time are available, then these codes could be entered instead of entering the program name, data, time, etc. Program codes are numbers which are associated with a particular program. If program codes are available, for example, in the local newspaper and TV guide, the user can set the multi-source recorder player 100 for recording by entering only these codes in the program recording option 202. This makes programming much easier. If program codes are available, then a different version of the user interface will be available to the user.

After all required selections are made from screens 5A-5D, start screen 507 appears as shown in Fig. 5E. The multi-source recorder player 100 is set to record by selection of the OK option 505. Alternatively, the record operation can be aborted by pressing cancel option 506.

Recorded programs are stored in storage section 104. A list of the programs stored and set for storing in storage section 104 may be viewed by choosing the stored program list option 203 from the main user control menu 200 shown in Fig. 2. When this option is selected, a stored program list screen 600 is output by controller 105 to output 112a.

The stored program list screen 600, shown in Fig. 6, may preferably include a list of all stored programs. This list may also include information such as title, source, channel, time of recording, the length of the program, and the date the program was recorded or is set to be recorded. The user may optionally enter any notes to be associated with the program when the stored program list 600 is output. The stored program list 600 may also preferably indicate whether the listed program has been recorded or has

previously been viewed, and may indicate how much, if any, storage space remains in storage section 104.

The stored program list 600 is linked to the program data in storage section 104. If data is removed from the storage section, then the stored program list 600 is updated to reflect this removal. If compressed data is reinstalled, for example when a removable media device is reinstalled, then the stored program list 600 will be updated by controller 105. The user may preferably update the stored program list 600. The user has a keypad on the control panel for text entry into the multi-source recorder player 100.

Alternatively, if titles or other information for programs are broadcast with the program or from a different source, then the controller 105 of the multi-source recorder-player 100 will automatically update the stored program list 600 from the broadcast information if this information is stored in storage section 104. The user thus only needs to input a minimum of information to setup a recording sequence. If more detailed notes and title information are desired, then they can be input by the user at any time, from the keypad when selecting the appropriate entry in the stored program list 600.

When the stored program list 600 is displayed, the user may lock certain of the listed stored programs. Locking a program involves selecting a program from the list and marking it as locked. A locked program will not be erased regardless of the program storage mode selected in the program storage option 301 selected in setup page 300, shown in Fig. 3. When inadequate unlocked storage in storage section 104 is reached, the multi-source recorder player 100 preferably alerts the user and presents a list of locked stored programs, preferably in a format similar

to stored program list 600, which are causing the storage capacity condition. The user must unlock the necessary amount of storage in storage section 104 before further recording requests may be accommodated.

The user can also set a filter on the stored program list, for example, to restrict the list of programs output on the stored program list 600 to those of interest to a single viewer. If there are two users of the multi-source recorder player 100, it is possible for each to view only his or her own listings and not those of the other person. This can be performed by incorporating a user password. Users of the multi-source recorder player 100 who do not know available passwords will be unable to access programs which are password-protected. The multi-source recorder player 100 can preferably handle a plurality of passwords and support multiple stored program lists for multiple users.

The multi-source recorder player 100, when operated as a multi-user device, will ask the user his or her password before making any menus or screens available. Once the password is received the multi-source recorder player 100 will interface with the user in the same way as described above, the only difference being that the listings of programs retained for this user will not include any listings for other users unless they are considered "shared" programs. Secondly, the neural network analysis circuit 114 will perform analysis for each user individually. The resulting analysis determining desired programs will thus be appropriate for each user.

In addition to viewing a list of stored programs, the user may also preferably select the routing controller option 204 shown on the main menu control screen 200 shown in Fig. 2. If the user chooses the routing controller option

204, the routing controller screen 700, shown in Fig. 7, is output from controller 105. When the routing controller screen 700 appears, the user first selects the output to which the signals are to be sent. The user selects, for example, one of outputs 112a-112c from the output selection 701. Output selection is not limited to outputs 112a-112c, but may be any of the outputs 112a-112h of the multi-source recorder player 100. The user then selects from the signal selection section 702 the types of signals which will be output by the output selected from output selection 701.

The routing controller option may be used to display signals without prior storage. With this option, the user sends incoming video and/or audio signals to the outputs, thus setting up connections between compression section 103 and decompression section 106, thereby bypassing the storage section 104.

In addition to routing the signals in the multi-source recorder player 100, the user can form composite images to be sent to the outputs. Composite images may be formed when the special effects option 205 is selected from the main menu control screen 200, shown in Fig. 2. With special effects screen 800, shown in Fig. 8, the user can select special video and audio effects. In a preferred embodiment of the present invention, composite images and programs can be formed since the multi-source recorder player 100 can output a plurality of programs on each of the outputs 112a-112h. This is useful, for example, for making original material from a collection of audio and video sources.

Special effects screen 800 includes effects section 801. With the effects section 801, the user can wipe or mix input signals. Particularly, mix option 802 may be selected which causes mix control screen to appear.

Mix control screen 900 allows a user to set the levels for video and/or audio signals. To operate the mix control screen 900 the user selects the program of choice by positioning the cursor and clicking on its picture. Once selected the user moves the slider 901a. This controls the mixing and effects processing section 108 causing a corresponding change at output section 112. This in turn allows the user to combine images and sounds dynamically. Thus, production of original material from the material stored in storage section 104 is possible with the multi-source recorder player 100. By selecting one channel from channel selectors 902, the mixing and effects processing section 108 can be separately set for each channel, thus allowing mixing and panning of audio and video.

From special effects screen 800, the user can also preferably select wipe option 803, which will cause wipe control screen 1000, shown in Fig. 10, to appear. The wipe control screen 1000 displays a list of available effects in wipe effect section 1010. The individual wipe effects 1010a-1010f allow the user to perform transitions between individual programs and between programs and backgrounds. The user preferably selects a desired wipe effect by choosing one of the wipe effect options 1010a-1010f.

The wipe control section 1011 allows the user to choose which programs and the portions of selected programs that will be wiped. First, the user selects which program or programs will be wiped from program selection option 1014. The user selects the desired program by moving the cursor over the program window and pressing select to set the controller 105 for effecting that program. Mix control screen 900 represents a virtual mix controller. Slider 901a and 901b allow for setting levels of audio or video signals thus controlling the mixing and effects process.

The user selects which program is being controlled by clicking on its picture, and then which of its channels are being effected by selecting one or more of the buttons for audio left or right 902a and 902b and video 902c.

If a particular wiping effect requires two programs, the user selects the first by selecting select program 1 option 1014a and then selects the second program by selecting select program 2 option 1014b. Program selections can be revised at any time simply by clicking on another program window.

The user can preferably choose to wipe between the two selected programs by selecting "wipe between programs" option 1013b from the wiping mix section 1013. Alternatively, the user can preferably choose to wipe between the program selected from select program 1 option 1014a and a background color by selecting "wipe to color" option 1013a. Selection of the "wipe to color" option will cause a screen with a list of colors to appear from which the user can preferably choose the background color.

The user preferably selects the portion of the selected program or programs to be wiped from frame section 1012. Program times are typically displayed in groups of frames each with a frame number. The beginning of the wipe is selected by entering the appropriate wipe start in the wipe start section 1012a. The end of the wipe may be indicated by entering the frame number where the wipe is to terminate in wipe end section 1012b.

Alternatively, if frame numbers are not known, the user can preferably mark the starting and ending times of wiping by using graphical display section 1015. The beginning point of the wipe is displayed as a graphical image in the graphical display section 1015a. The point where the wipe is to end is displayed as a graphical image in the



graphical display section 1015b. This is very much like selecting points on a visual based editor such as from the Video F/X video editing system which runs on Macintosh computers sold by Apple Computers, Inc.

In addition to special effects, the user may also select database access from the main menu control screen 200 by choosing database option 206, shown in Fig. 2. Database access screen 1100, shown in Fig. 11, is displayed by controller 105 as a result of the user selecting this option.

The user can employ screen 1100 to search for desired programming by entering a search query. The user enters textual information via a keyboard which is preferably part of the controller 105. Searching is controlled by a database server working in conjunction with the multi-source recorder player 100. If the database server has a larger number of fields then the lookup screen may differ from that shown in Fig. 11. For example, the screen may contain more fields with labels or it may contain a series of questions to be answered for assisting the search.

The results of the search are output in output section 1120 as a series of pictures. The picture displayed for each result will be provided by the database server. Once downloaded from the database server to the multi-source recorder player 100, the programs found as a result of the search will be handled in the same way as other programs which are available from the stored program list 600 shown in Fig. 6.

User interaction, as described above with respect to Figs. 2-11, may preferably be accomplished by keys, or by vocalizing a command to a voice interactive control system. Key commands involve using a mouse and associated software. The user directs a pointer to a graphic display and clicks on desired options in the programming process. The voice

interactive control system senses voiced commands and produces corresponding resulting control signals and responses. Both mouse and voice control can operate the user options shown on main menu control screen 200, shown in Fig. 2.

Fig. 12 is a block diagram of the voice control system 1200 of the present invention. The voice control system 1200 includes vocal interface 1201. Vocal interface 1201 may preferably be a microphone which receives and amplifies voice commands from the user. The voice signals amplified by vocal interface 1201 are input to analog to digital converter 1202. The converted signal is output to waveform monitor and pattern comparator 1203.

Voice recognition and control circuitry is currently commercially available and is preferably interfaced to control the multi-source recorder player 100. Voice recognition controllers allow a user to voice requests rather than pressing keystrokes and selecting menu options with a cursor controller. The combination of vocal interface 1201, a/d converter 1202, and waveform monitor and pattern comparator 1203 convert sound pressure into signals which control the recording and other processing performed by the multi-source recorder player 100.

In addition, a voice response output may be mixed with program data stored in program storage 104 in mixing and effects section 108, and output to the audio output of one of outputs 112a-112h of the multi-source recorder player 100. When using the voice control system, the user may preferably voice desired selections, hear previously stored voice segments, and hear synthesized voice messages.

By using the user controls described with respect to Figs. 2-11, a program or plurality of programs may be formatted and recorded. In order to perform recording, the

user preferably follows the steps shown in the flowchart of Fig. 13.

The user first selects the record program mode (step 1310) to specify what to record and how often to record it. Once the decision is made, a Gregorian calendar is displayed and the user chooses the month (step 1320), day (step 1330) and then the time (step 1340) to record. The selection from the calendars corresponds with the calendar screens shown in Figs. 4A-4C.

The user next selects the program channel to be recorded (step 1350) and the source connection for the program (step 1360). In the source connection step 1360, the user selects the type of input signal which is to be recorded so that it is input correctly to the demodulator section 101 of the multi-source recorder player 100.

Next, the user provides the name of the program to be recorded (step 1370) in either textual or voiced format. The user then enters the frequency with which the program is to be recorded (step 1380). The program which was programmed to be recorded is recorded until the user indicates otherwise (step 1390).

Fig. 14 shows a remote control panel 1400 which can be for multi-source recorder player 100. While viewing live video, the user can press the record button on a control panel 1400 and immediate recording will take place. If the auto recording storage allocation section 305, shown in Fig. 3, is set, the material recorded can precede the record request of the user. In this way, an entire program can be retained when the choice to record the program is made after viewing it. The chosen program is then retained from the cycling FIFO.

The user then selects the specific signals to be output to the selected output from select output section 703. After this selection, VHF Channel 2, VHF Channel 4, and Cable Channel 21 may be simultaneously output to output 112a, for example. Once selected, sliding the controllers 901a or 901b will set a level or balance for the chosen channels of audio and or video. If two programs are being effected then the user selects twice, once for each program before making the adjustments.

If a program is not currently on screen the user can select it for the program list. Once selecting the program the user may start the program by pressing the play button 1405c on the remote control panel 1400.

Remote control panel 1400 allows the user to position the cursor with section 1408. Once the cursor is positioned over a chosen program and select button 1408a is pressed, the user may use playback control section 1405 or routing section 1401-1403 to control the program.

When names and textual input are required, panel 1407 is used. The "interesting" and "uninteresting" buttons 1411 and 1412 are used to help teach the neural network analysis circuit 114 the user's preferences. The program list button 1403b is used to display the program list on the control monitor. The source and output buttons 1401 and 1402 are used in conjunction with the connect button 1403a to arrange program routing.

Accordingly, the multi-source recorder player of the present invention can receive a plurality of different types of input signals. The user has a great deal of control over the signals that are input and can output the signals to one or more receivers. Input signals may be stored in a storage section for later playback or manipulation.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

WHAT IS CLAIMED IS:

1. An audio/video recorder system comprising:  
input port means for receiving a plurality of transmission signals each containing program information;  
and  
storage means, coupled to the input port means, for simultaneously storing the plurality of received transmission signals.
2. The audio/video recorder system of claim 1 further including demodulator means, coupled to the input port means, for transforming the received signals into digital signals each corresponding to a different set of program information.
3. The audio/video recorder system of claim 2 wherein the demodulator means further includes:  
receiver means for forming baseband signals each corresponding to a different one of the received signals;  
and  
analog/digital converter means, coupled to the receiver means, for forming the digital signals from the baseband signals.
4. The audio/video recorder system of claim 1 wherein the storage means includes data compression means for compressing each of the acceptable received signals prior to storage.
5. The audio/video recorder system of claim 1 further comprising analysis means, coupled to the input port means, for assessing predetermined criteria of each of the received signals to determine acceptable ones of the plurality of received transmission signals.
6. The audio/video recorder system of claim 5 further including means for causing the storage means to implement recurring recording.

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7. The audio/video recorder system of claim 1 further including a data manager, coupled to the storage means, for managing the stored program information.

8. The audio/video recorder system of claim 1 wherein the storage means includes means for erasing from the storage means stored program information according to a predetermined priority.

9. The audio/video recorder system of claim 8 wherein the means for erasing includes means for erasing stored program information in a first-in/first-out order.

10. The audio/video recorder system of claim 8 further including override means for disabling the means for erasing.

11. The audio/video recorder system of claim 10 wherein the override means includes means for disabling the means for erasing selected stored program information.

12. The audio/video recorder system of claim 8 further including means for retaining programs prior to selection on one or more channels of incoming programs.

13. An audio/video recorder system comprising:  
input port means for receiving a plurality of transmission signals each containing program information;  
storage processing means, coupled to the input port means, for storing the program information in the plurality of received transmission signals; and  
playback means, coupled to the storage means, for retrieving and playing desired program information from the stored received transmission signals, for playing program information simultaneously with the storing of program information by the storage processing means, and for playing different program information simultaneously.

14. The audio/video recorder system of claim 13 wherein the storage processing means includes:  
data compression means for compressing each of the received transmission signals prior to storage; and  
wherein the playback means includes:  
data retrieval means for retrieving program information; and  
decompression means for decompressing the retrieved program information.

15. The audio/video recorder system of claim 13 wherein the playback means includes a display device to display the retrieved program information.

16. The audio/video recorder/playback system of claim 13 wherein the playback means includes an audio amplifier to play the retrieved program information.

17. The audio/video recorder system of claim 13 wherein the input port means includes:  
means for receiving a plurality of transmission signals; and  
wherein the storage processing means includes means for simultaneously storing the received transmission signals.

18. The audio/video recorder system of claim 13 further including analysis means, coupled to the input port means, for assessing predetermined criteria of each of the received signals to determine acceptable ones of the received signals.

19. An audio/video recording device for simultaneously storing information from a plurality of sources, the recorder comprising:  
input port means for receiving a plurality of transmission signals; and



storage means, coupled to the input port means, for simultaneously storing the received transmission signals.

20. The audio/video recording device of claim 19 further including analysis means, coupled to the input port means, for assessing predetermined criteria of each of the received signals to determine acceptable ones of the received signals.

21. The audio/video recording device of claim 19 wherein the storage means includes data compression means for compressing, prior to storage, each of the acceptable received signals.

22. The audio/video recording device of claim 19 wherein the plurality of transmission signals may have different formats, and wherein the device further includes demodulator means, coupled to the input port means, for transforming the received transmission signals of each different format into digital signals each corresponding to a different one of the received transmission signals.

23. The audio/video recording device of claim 22 wherein the demodulator means further includes audio/video demodulator means for separately extracting the video and audio signals from each of the received transmission signals.

24. The audio/video recording device of claim 22 wherein the demodulator means further includes:

receiver means for forming baseband signals each corresponding to a different one of the received transmission signals; and

analog/digital converter means, coupled to the receiver means, for forming the digital signals from the baseband signals.

25. The audio/video recording device of claim 23 wherein the audio/video demodulator means further includes:  
video receiver means for forming baseband video signals for each of the received transmission signals;  
audio receiver means for forming baseband audio signals for each of the received transmission signals;  
video analog/digital converter means, coupled to the video receiver means, for forming video ones of the digital signals from the baseband video signals; and  
audio analog/digital converter means, coupled to the audio receiver means, for forming audio ones of the digital signals from the baseband audio signals.

26. The audio/video recording device of claim 19 further including means for causing the storage means to implement periodic recording.

27. The audio/video recording device of claim 19 further including a data manager, coupled to the storage means, for managing the stored transmission signals.

28. The audio/video recording device of claim 27 wherein the data manager includes control means for outputting a list of predetermined ones of the received transmission signals stored in the storage means upon entry of a user password.

29. The audio/video recording device of claim 19 wherein the storage means includes means for erasing from the storage means stored transmission signals according to a predetermined priority.

30. The audio/video recording device of claim 29 wherein the means for erasing includes means for erasing stored transmission signals in a first in/first out order.

31. The audio/video recording device of claim 29 further including override means for disabling the means for erasing.

32. The audio/video recording device of claim 31 wherein the override means includes means for disabling the means for erasing selected stored transmission signals.

33. An audio/video routing device comprising:  
input port means for receiving a plurality of transmission signals;  
demodulator means, coupled to the input port means, for transforming the received transmission signals into digital signals each corresponding to a different one of the received transmission signals; and  
routing means for controlling the forwarding of the digital signals.

34. The audio/video routing device of claim 33 wherein the transmission signals include program information, and wherein the routing device further includes playback means, coupled to the routing means, for playing at least some of the program information in the received transmission signals.

35. The audio/video routing device of claim 34 wherein the playback means includes means for simultaneously playing a plurality of the program information in the received transmission signals.

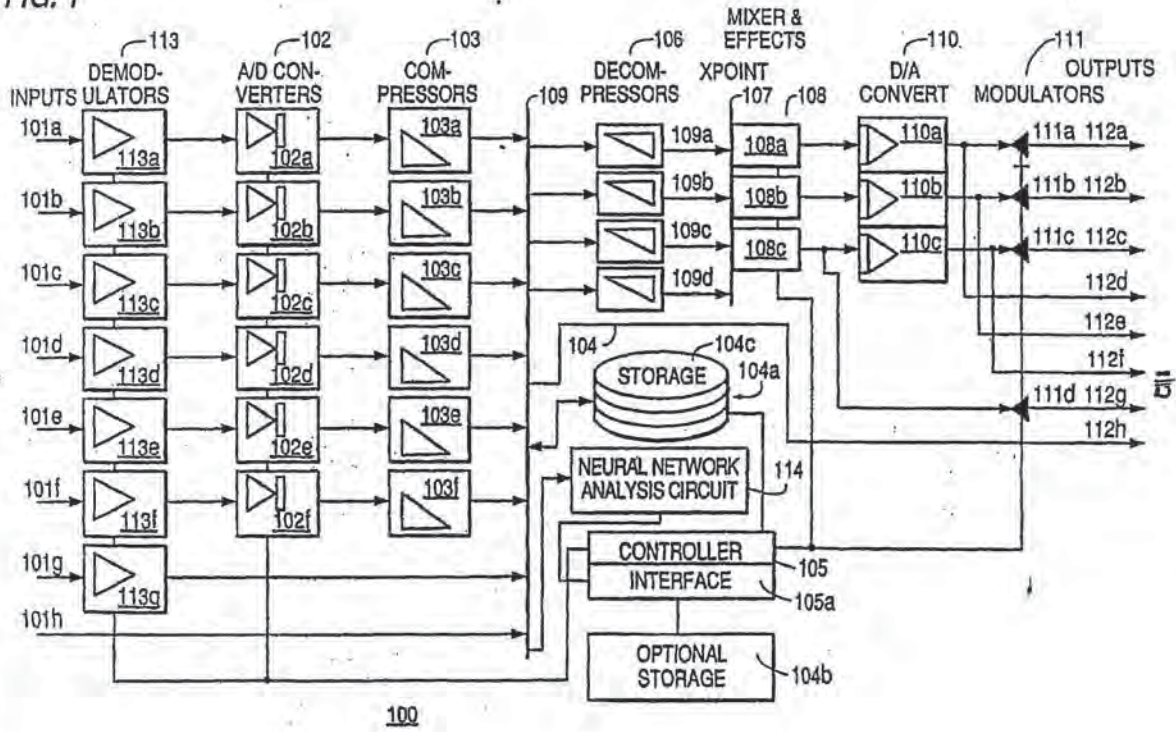
36. The audio/video routing device of claim 33 further including remote control means for controlling the operation of said routing device from a position remote from the device.

37. The audio/video routing device of claim 33 further including an output port, wherein the routing means includes means for routing the digital signals to the output port.

38. The audio/video routing device of claim 37 wherein the routing means includes voice activation means for controlling the routing means.

39. An audio/video recorder system comprising:  
input port means for receiving a transmission  
signal containing program information;  
storage means, coupled to the input port means,  
for simultaneously storing the plurality of received trans-  
mission signals; and  
analysis means, coupled to the input port means, for  
assessing predetermined criteria of each of the received  
signals to determine acceptable ones of the plurality of  
received transmission signals.

FIG. 1



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FIG. 2

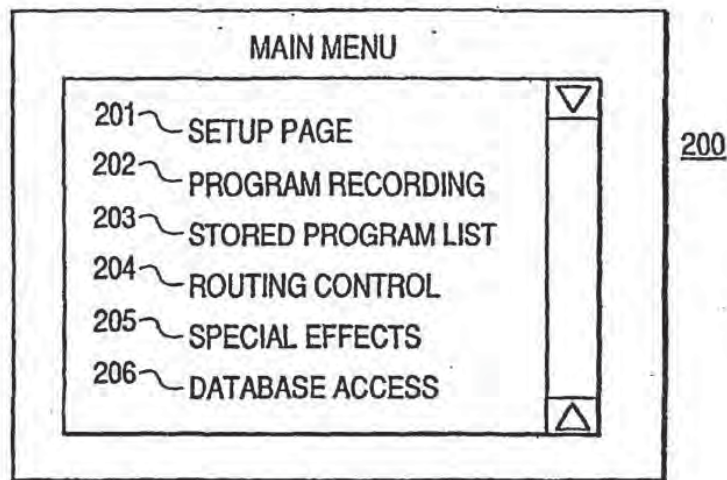
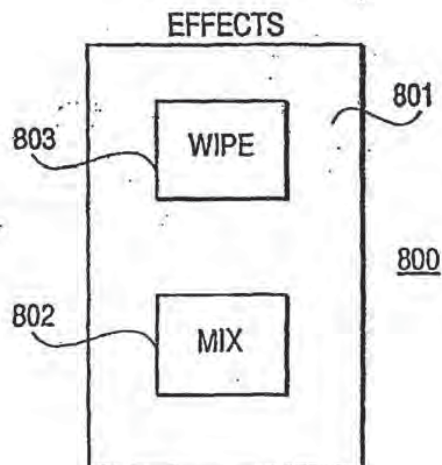


FIG. 8



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FIG. 3

300

312

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|   |  |             |     |          |               |     |          |           |     |  |
|---|--|-------------|-----|----------|---------------|-----|----------|-----------|-----|--|
| VIDEO CONTROL DISPLAY ON OUTPUTS: 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/><br>AUDIO CONTROL VOICED ON OUTPUTS 1L <input checked="" type="checkbox"/> 1R <input checked="" type="checkbox"/> 2L <input type="checkbox"/> 2R <input type="checkbox"/> 3L <input type="checkbox"/> 3R <input type="checkbox"/> |  |             |     |          |               |     |          |           |     |  |
| <b>PROGRAM ERASURE</b> <input checked="" type="checkbox"/> 301<br><input type="radio"/> ERASE OLDEST PROGRAMS (FIFO)<br><input type="radio"/> ERASE OLDEST VIEWED PROGRAMS<br><input type="radio"/> ERASE ONLY SELECTED PROGRAMS  |  |             |     |          |               |     |          |           |     |  |
| <b>OUTPUT CONTROL SETUP</b> <input checked="" type="checkbox"/> 302<br><table border="1"> <tr> <td>OUTPUT 1</td> <td>TV WIRELESS</td> <td>312</td> </tr> <tr> <td>OUTPUT 2</td> <td>PANASONIC VHS</td> <td>322</td> </tr> <tr> <td>OUTPUT 3</td> <td>CONTROL L</td> <td>332</td> </tr> </table>   | OUTPUT 1   | TV WIRELESS | 312 | OUTPUT 2 | PANASONIC VHS | 322 | OUTPUT 3 | CONTROL L | 332 | <b>PROGRAM DISPLAY MODES</b><br><input type="radio"/> WINDOWED <input checked="" type="checkbox"/> 304a<br><input type="radio"/> TILED <input checked="" type="checkbox"/> 304b<br><input type="radio"/> FULL SCREEN <input checked="" type="checkbox"/> 304c<br>SELECT OUTPUT<br><input type="radio"/> 1 <input checked="" type="checkbox"/> 112a<br><input type="radio"/> 2 <input checked="" type="checkbox"/> 112b<br><input type="radio"/> 3 <input checked="" type="checkbox"/> 112c |
| OUTPUT 1  | TV WIRELESS                                      | 312         |     |          |               |     |          |           |     |  |
| OUTPUT 2  | PANASONIC VHS                                    | 322         |     |          |               |     |          |           |     |  |
| OUTPUT 3  | CONTROL L  | 332         |     |          |               |     |          |           |     |  |
| <b>SET RECORDING CRITERIA</b> <input checked="" type="checkbox"/> 303<br><input type="checkbox"/> MONITOR VIEWER <input checked="" type="checkbox"/> 303a<br><input type="checkbox"/> MONITOR "INTERESTING" + "UNINTERESTING" BUTTONS <input checked="" type="checkbox"/> 303b<br><input type="checkbox"/> OFF <input checked="" type="checkbox"/> 303c                   | <b>AUTO RECORDING STORAGE ALLOCATION</b> 305<br> |             |     |          |               |     |          |           |     |  |

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FIG. 4B

| JUNE |     |     |     |     |              |     | 400 |
|------|-----|-----|-----|-----|--------------|-----|-----|
| SUN  | MON | TUE | WED | THU | FRI          | SAT | 402 |
|      | 1   | 2   | 3   | 4   | <del>5</del> | 6   |     |
| 7    | 8   | 9   | 10  | 11  | 12           | 13  |     |
| 14   | 15  | 16  | 17  | 18  | 19           | 20  |     |
| 21   | 22  | 23  | 24  | 25  | 26           | 27  |     |
| 28   | 29  | 30  |     |     |              |     |     |

FIG. 4C

| SAT JUNE 5th |              | 403 |
|--------------|--------------|-----|
| AM           |              |     |
| 1            |              |     |
| 2            |              |     |
| 3            |              |     |
| 4            |              |     |
| 5            |              |     |
| 6            |              |     |
| 7            | <del>X</del> |     |
| 8            |              |     |
| 9.0          |              |     |
| PM           |              |     |
| 1            |              |     |
| 2            |              |     |
| 3            |              |     |
| 4            |              |     |
| 5            |              |     |
| 6            |              |     |
| 7            |              |     |
| 8            |              |     |

FIG. 4A

| 1990 |     |                |  | 401 |
|------|-----|----------------|--|-----|
| JAN  | FEB | MAR            |  |     |
| APR  | MAY | <del>JUN</del> |  |     |
| JUL  | AUG | SEP            |  |     |



51a

FIG. 5A



FIG. 5B

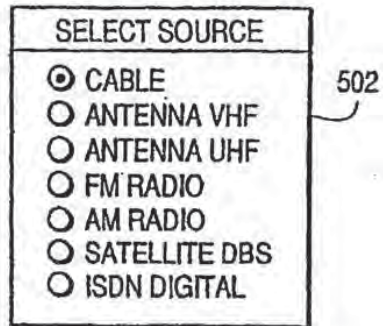


FIG. 5C

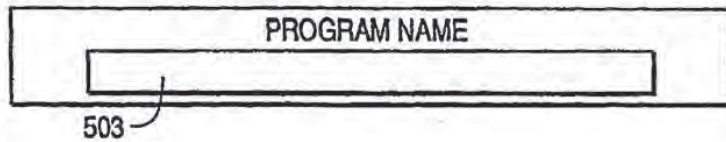


FIG. 5D

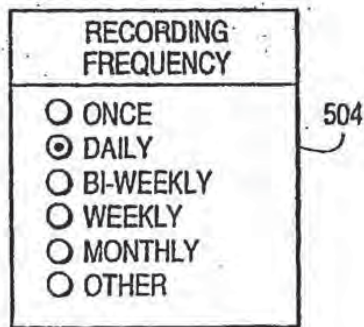


FIG. 5E

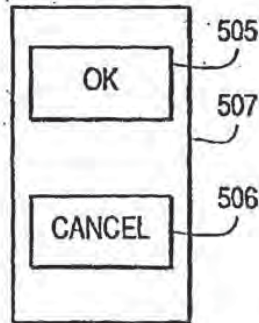


FIG. 6

600

|                     |          |
|---------------------|----------|
| FREE PROGRAM MEMORY | 4.75 HRS |
|---------------------|----------|

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| # | LOCKED                              | TITLE           | SOURCE | CHANNEL | TIME         | DATE         | LENGTH | NOTES            | VIEWED                              |
|---|-------------------------------------|-----------------|--------|---------|--------------|--------------|--------|------------------|-------------------------------------|
| 1 | <input type="checkbox"/>            | -- NOT YET --   | VHF    | 4       | 4:00 - 4:30  | MAY 17, 1991 | 0.5    | NOT YET RECORDED | <input type="checkbox"/>            |
| 2 | <input type="checkbox"/>            | --              | FM     | 99.5    | 1:12 - 1:20  | MAY 15, 1991 | 0.12   |                  | <input checked="" type="checkbox"/> |
| 3 | <input type="checkbox"/>            | NIGHTLY NEWS    | VHF#   | 4       | 6:00 - 8:00  | MAY 13, 1991 | 2.0    |                  | <input type="checkbox"/>            |
| 4 | <input checked="" type="checkbox"/> | BATMAN          | CABLE  | 29      | 8:00 - 10:00 | DEC 28, 1990 | 2.0    | KEEP FOR WENDY   | <input type="checkbox"/>            |
| 5 | <input type="checkbox"/>            | THE ASTRONOMERS | VHF    | 13      | 6:30 - 7:30  | MAY 13, 1991 | 1.0    |                  | <input type="checkbox"/>            |

6112

71a

FIG. 7

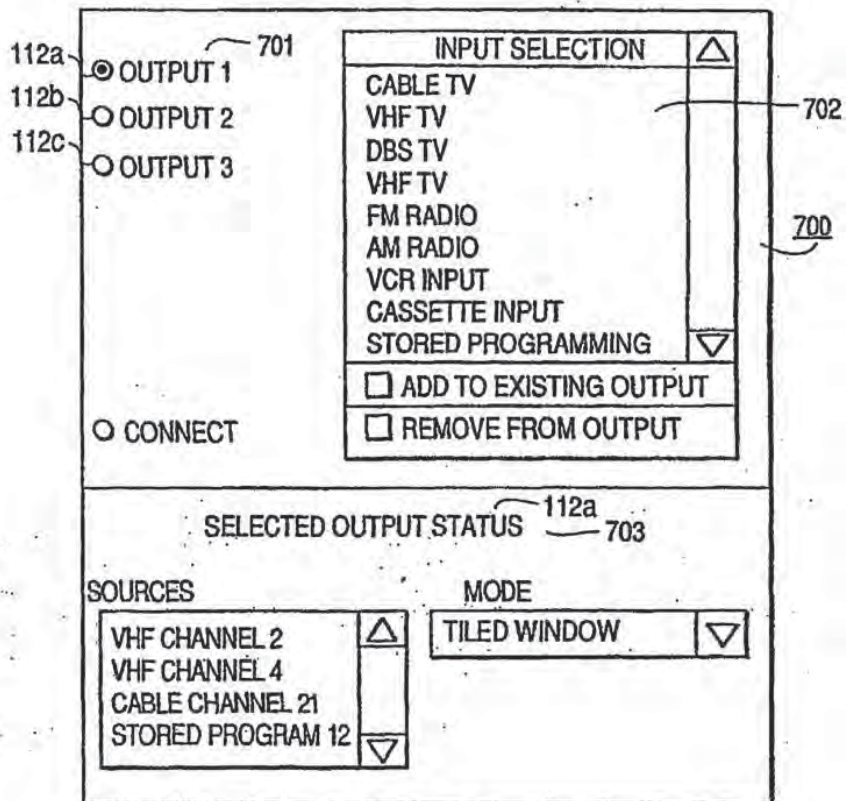
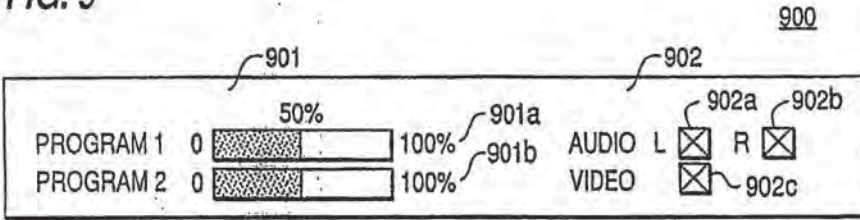


FIG. 9



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FIG. 12

