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First Named Inventor/Applicant Name:	6233389
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		Document Description	Start	End	
		Reexam Miscellaneous Incoming Letter	1	1	
		Trans Letter filing of a response in a reexam	2	2	
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				Application Number	90/009,329
				Filing Date	November 10, 2008
				First Named Inventor	James M. BARTON
				Art Unit	3992
				Examiner Name	Ferris III, Fred O.
Sheet	1	of	2	Attorney Docket Number	2513.002REX0

U.S. PATENT DOCUMENTS					
Examiner Initials ¹	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
	US40	2001/0013120 A1	08-09-2001	Tsukamoto	
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		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
	FP20	EP 0 784 400 A2	07-16-1997	Wong		
	FP21	JP 61-133089 A	06-20-1986	Kobune <i>et al.</i>		
	FP22	JP 2-266774 A	10-31-1990	Iwasaki		
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				Art Unit	3992
				Examiner Name	Ferris III, Fred O.
Sheet	2	of	2	Attorney Docket Number	2513.002REX0

U.S. PATENT DOCUMENTS					
Examiner Initials [*]	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (If Known)			
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FOREIGN PATENT DOCUMENTS						
Examiner Initials [*]	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
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Sheet	1	of	1	<i>Attorney Docket Number</i>	2513.002REX0
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials*	Cite No. ¹	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 ²
	NPL57	INTELLECTUAL PROPERTY LIBRARY, "Sitrick Vs. Dreamworks LLC," (CAFC) 85 USPQ2d, 1826, revised February 5, 2008, 9 pages.			
	NPL58	English language abstract for Japanese Patent Publication No. JP 61-133089 A, published June 20, 1986, 2 pages.			
	NPL59	English language abstract for Japanese Patent Publication No. JP 2-266774 A, published October 31, 1990, 2 pages.			
	NPL60	English language abstract for Japanese Patent Publication No. JP 3-34685 A, published February 14, 1991, 2 pages.			
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(54) **Entertainment system for portable computer**

(57) A portable computer is provided with a multi-media entertainment system wherein all hardware including electronic circuits and other components for the entertainment system are fully integrated in a notebook computer. The invention integrates television electronics (1), AM/FM radio circuits (4), a CD-ROM (compact disk-read only memory) drive, (8) miniaturized 8-mm VCR (7) into a notebook computer, such as an IBM Thinkpad 750C computer. Software running on the notebook computer provides a graphical user interface wherein the user can use a key stroke, mouse, or track point to tune to different channels or adjust the volume, brightness, contrast, or play, stop/eject, fast-forward, pause, and rewind using icons which mimic controls that might be found on a conventional television, radio, VCR or CD-ROM drive.

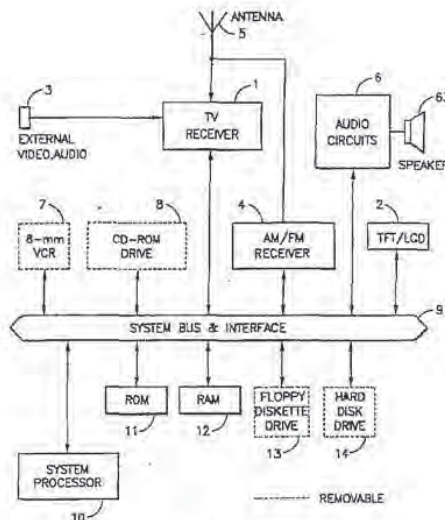


FIG. 1

Description

The present invention generally relates to light-weight, portable computers and, more particularly, to an entertainment system which is fully integrated into the portable computer and supported by software running on the computer.

BACKGROUND DESCRIPTION

Small portable computers, sometimes referred to as notebook computers, are commonly used in a variety of demanding environments for productivity and convenience. The progress of computer technology has made notebook computers small, yet powerful enough to use in many different physical environments such as, for example, at home, in vehicles, or even outdoors.

Often, notebook computers are carried by professional or business users when they travel. During such occasions, particularly in airports, users have long periods when they are simply passing time. Hence, it would be advantageous to integrate an entertainment system into a notebook computer to thereby allow a user, waiting to board an airplane, to watch television, watch a movie, or listen to music.

In the past, devices have been developed to occupy and entertain travelers. For example, U.S. Patent 4,521,021 to Dixon shows a video game table for airplanes in which a video console attaches to the seat backs to form a table for playing video games from video cartridges. While entertaining, this approach is not portable and limited to playing video games in passenger vehicles so equipped.

U.S. Patent 4,866,515 to Tagawa et al. shows a passenger service and entertainment system for supplying frequency-multiplexed video, audio, and television game software signals to user's seats. The system consists of a central transmitting apparatus and a plurality of cathode ray tube (CRT) or liquid crystal display (LCD) terminal units mounted in seats, such as, for example, airplane seats, stadium seats, or theater seats. The central transmitting apparatus of the system distributes video signals, audio signals, and television game software signals to the terminal units through frequency-multiplexing. Both the central transmitting apparatus and each of the terminals are permanently located at a fixed location.

Similarly, the marriage of desk-top computers and television has been experimented with in the past with very limited applications. For example, U.S. Patent 5,374,952 to Flohr shows a video conferencing system for fixed location computer workstations that operates on local area networks to exchange data and to transmit cable television signals via a coaxial cable television wire.

Likewise, U.S. Patents 5,359,367 to Stockhill, 5,249,164 to Koz, and 5,283,819 to Glick et al. show personal desk-top computers with added television capabilities. An obvious drawback to all of these devices

is that desk-top computers cannot be carried around. Furthermore, only partial hardware is included and, therefore, still requires the user to provide the necessary video signal source such as an external antenna, or a video cassette recorder (VCR) input in order to function.

SUMMARY OF THE INVENTION

In a first aspect, the present invention provides an entertainment system which is fully integrated into a computer and supported by software running on the computer. The invention provides an entertainment system integrated into a portable computer, comprising: at least one of a television receiver and a radio receiver; and a built-in antenna mounted to said portable computer for providing broadcast signals to one of said television receiver and said radio receiver.

According to a preferred embodiment of the invention, all hardware, including electronic circuits and other components, for the entertainment system is fully integrated in a notebook computer. More specifically, the invention integrates television electronics, AM/FM radio circuits, a CD-ROM (compact disk-read only memory) drive, and a miniaturized 8-mm VCR into a notebook computer, such as an IBM Thinkpad 750C computer. The entertainment system takes advantage of the ultra-high resolution thin film transistor, liquid crystal display (TFT/LCD) which is already part of modern notebook computers. Hence, the entertainment system can be integrated into the notebook computer at minimum cost.

The entertainment system comprises of a television, radio, removable CD-ROM audio and/or video disc, and a removable 8-mm VCR. Software running on the notebook computer provides a graphical user interface wherein the user can use a key stroke, mouse, or track point to tune to different channels and adjust the volume, brightness, and contrast using icons which mimic controls that might be found on a conventional television, radio, VCR or CD-ROM drive. In addition, the software has the capability of displaying the television image in a separate window on the display while simultaneously displaying information on applications running in other windows.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other aspects and advantages will be better understood from the following detailed description of a preferred embodiment of the invention with reference to the drawings, in which:

Figure 1 is a block diagram showing the architecture of the entertainment system according to the invention;

Figure 2 is a pictorial view of a notebook computer incorporating the television and the AM/FM radio circuitry of the entertainment system according to the invention;

Figure 3 is a pictorial view of a notebook computer shown in Figure 2 having its floppy diskette drive replaced with a VCR or CD-ROM drive;

Figure 4 is a pictorial view of a notebook computer shown in Figure 2 having its floppy diskette drive replaced with a VCR and its removable hard drive replaced with a CD-ROM drive;

Figure 5 is a block diagram showing the video and audio circuits of the television receiver of the entertainment system;

Figure 6 is a block diagram of the radio receiver of the entertainment system;

Figure 7 is a block diagram showing the combined audio output of the entertainment system;

Figure 8 is a flow diagram showing the logic of the software running on the notebook computer that controls the entertainment system;

Figure 9 is the entertainment system main selection screen;

Figure 10 is an illustration of the television control graphical user interface screen;

Figures 11A-11B are a flow diagram showing the logic of the software running on the notebook computer that controls the television receiver;

Figure 12 is an illustration of the AM/FM radio control graphical user interface screen;

Figure 13 is a flow diagram showing the logic of the software running on the notebook computer that controls the AM/FM radio receiver;

Figure 14 is an illustration of a combined VCR/CD-ROM control graphical user interface screen;

Figure 15 is a flow diagram showing the logic of the software running on the notebook computer that controls the CD-ROM drive; and

Figure 16 is a flow diagram showing the logic of the software running on the notebook computer that controls the VCR.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Referring now to the drawings, and more particularly to Figure 1, there is shown a system block diagram of the entertainment system integrated into a notebook computer according to a preferred embodiment of the present invention. As shown in Figure 1, the television receiver 1 and accompanying circuitry receive a plurality of broadcast television signals from either an external source connected to jack 3 or an antenna 5 to provide a television picture which can be displayed on an inset of a computer display 2. It is important that a built-in antenna be provided since, in order to be fully portable, a constant source of broadcast signals must be available. In the preferred embodiment of the invention, the display used is a 12.1 inch color thin film transistor/liquid crystal display (TFT/LCD), as used in the IBM Thinkpad notebook computer.

An 8-mm VCR 7 or a CD-ROM drive 8 provide alternate sources for video signals. Each of the television

receiver 1, the 8-mm VCR 7, and the CD-ROM drive 8 are connected to the display 2 via the system bus 9 of the notebook computer. The 8-mm VCR 7 may be built into the notebook computer but is typically added to it as a detachable module, as indicated by the dashed lines. The CD-ROM drive 8, which may also be built into the notebook computer but, again, is typically a detachable module, is capable of playing computer CD-ROMs, audio CDs as well as the newer MPEG video CDs.

The antenna 5 is also connected to an AM/FM receiver 4. The audio output of the AM/FM receiver 4 as well as the audio output from television receiver 1, 8mm VCR 7, and CD-ROM drive 8 are supplied to audio circuits 6 providing an output to a speaker 63 or, selectively, an earphone (not shown).

The notebook computer includes a system processor 10, such as an Intel Pentium[®] or IBM PowerPC[®] microprocessor. The system processor is supported by read only memory (ROM) 11, which stores the basic input/output system (BIOS), and random access memory (RAM) 12, which stores portions of the operating system (OS) and application programs. Also, the notebook computer has a hard disk drive 14 having sufficient capacity to support multimedia programs run on the computer. The hard disk drive 14 may be augmented by a second hard disk drive 15 in the form of a detachable module, as indicated by the dashed lines. In addition, a floppy diskette drive 13, which may be built into the notebook computer but is typically provided as a detachable module, is provided to receive input from removable diskettes.

Software, shown in the flow charts discussed below, running on the system processor 10 is used to control the display of a television picture in association with the computer operating system (OS) software that enables the computer to undertake other functions concurrently. The quality of the television picture, contrast, brightness, volume, and channel selection can be operated by using a mouse (or track point in IBM Thinkpad notebook computer) or keyboard. Similarly, software is used to control the other multimedia functions, as will be described in more detail.

Figure 2 is a pictorial diagram of a notebook computer 20 of the type which may incorporate the entertainment system according to the invention. The notebook computer has a TFT display 21 and a keyboard 22. Outwardly, the notebook computer looks very much like any other notebook computer with the exception of the added telescoping antenna 23, which is conveniently housed in an edge of the fold-up TFT display 21. It will be understood that other types of extendable antenna, such as spring-loaded rabbit ears, may be used. In the preferred embodiment, the television receiver circuitry and the AM/FM radio circuitry 4 is positioned behind the TFT display 21.

Figures 3 and 4 show a view of the IBM Thinkpad 750C computer with the keyboard 22 lifted to allow access to the removable modules. In Figure 3, a battery 16, and a hard-disk drive 14 are shown with a floppy dis-

kette drive 13 removed to make room for either the 8mm VCR 7 or the CD-ROM drive 8. In Figure 4, a configuration is shown where the floppy diskette drive 13 is swapped for the 8-mm VCR 7, and the removable hard disk drive 14 is swapped for the CD-ROM drive 8. The removable hardware allows the entertainment system to be contained in one compact easy to carry chassis and provides the options for users to choose whether to use these the additional entertainment functions or not. The removable 8-mm VCR 7 and CD-ROM 8 can operate as entertainment functions which send video signals to television receiver 1 circuits for processing and displaying onto the TFT/LCD display 2 and audio signals to the audio circuit 6, or can function as storage devices via the Small Computer System Interface (SCSI) and system bus 9 to communicate with the notebook computer's standard ports, such as the system microprocessor 10, RAM 12, and serial and parallel ports (not shown) for other computer tasks.

The additional hardware of the notebook entertainment system does not substantially increase the power consumption for normal usage. This is because the TFT/LCD display 2, which is used for both computing and entertainment, typically consumes the most power of any component (typical power consumption 5.65 watt in battery mode, 8.95 watt in AC adaptor mode). The power to the unused part of the system, whether used as a computer system or entertainment system, can be turned off if not in use to save power.

The total weight of the electronic circuits of the television receiver 1, the AM/FM receiver 4, and the antenna 5, is estimated to be 8 ounces. Since audio circuits and TFT/LCD display controller circuits are already part of the notebook computer, the television receiver 1 and AM/FM receiver 4 radio may exploit these existing circuits and therefore add only minimum weight to the notebook computer.

Figure 5 shows a detailed block diagram of the television receiver 1, shown in Figure 1. The television receiver 1 is comprises an RF (radio frequency) tuner 30 which includes electronic tuning circuits, video/audio IF (intermediate frequency) and detector circuit 32, and local processor 33 which performs signal conditioning and converts NTSC (National Television System Committee) signals to digital RGB (red-green-blue) signals. To receive broadcast television signals, the antenna 5 picks up an incoming RF signal and the RF tuner 30 tunes the VHF/UHF bands. The television receiver can be scanned electronically and continuously under the control of software until a detectable channel is captured by the RF tuner's 30 electronic tuning circuits. It is desirable to have the option of the electronic scanning for television reception since the portable entertainment system with the notebook computer may be used in a location of television channel selection unfamiliar to the user.

The desired television channel may also be selected directly by using keyboard or mouse through the software. Once the incoming RF signal from the

antenna 5 is converted to an IF signal, the IF signal output from the RF tuner 30 is fed to an IF amplifier 31 to be amplified. The amplified IF signal is then passed into the video/audio IF and detector 32 which can be implemented by an integrated circuit such as the TA8680 from Toshiba or other off-the-shelf electronic components. The audio signal can be extracted by the video/audio IF and detector 32 from the amplified IF signal as an intercarrier component at 4.5 MHz. While the desired output of the audio signal from the video/audio IF and detector 32 is input to the audio circuit 6 (Figure 1) for audio processing and output to the speaker 64, the video output signal from the video/audio IF and detector 32 is input to the local processor 33 to be further processed and converted to digital RGB signals, with 6-bits for each of the RGB signals. The RGB data is supplied to the TFT/LCD controller of the notebook computer display.

External connectors for audio and video inputs are also available. For example, a video camera recorder may provide the video and audio signals to the entertainment system and use the TFT/LCD display 2 for displaying its video picture. External video and audio inputs are connected to the video/audio IF amplifier 31 and the external video and audio signals are further processed in the same fashion as a broadcast television signal.

Referring now to Figure 6, the AM/FM radio receiver circuit 41 shares the local processor 33, the local bus 34 and the antenna 5 with the television receiver 1. The AM/FM radio receiver circuit 41 can be implemented with an integrated circuit in a single package which is readily available as an off-the-shelf item such as radio module TEA5757 from Phillips. The notebook computer entertainment system software and the local processor 33 help to provide the following additional functions from the AM/FM receiver circuit 41, which can be operated from mouse/keyboard 22 of the system. The functions include automatic electronic tuning, volume, scanning, preset and AM/FM channel selections.

A difficulty with embedding the combination of entertainment system and notebook computer into a single notebook computer chassis is the packaging of all the hardware of the entertainment system with the hardware of the notebook computer due to the constraints of space availability and light weight of the entire notebook computer system. A solution provided by the present invention is maximization of the shared use of hardware and circuits; for example, referring back to Figure 1, the television receiver 1 and the AM/FM radio 4 share the same antenna 5 and audio circuits 6.

Referring now to Figure 7, in a similar manner, a single audio circuit 50 including an audio mixer 61, audio amplifier 62, earphone jack 64, and speaker 63 is shared by all the entertainment functions and system computer. The audio mixer 61 selects an audio input from either the TV audio 65, the AM/FM radio audio 66, the 8mm VCR/CD-ROM audio 67, or the computer

audio 68. The output of the audio mixer 61 is input to the earphone jack 64 and to the power amplifier 62 for amplification to the speaker 63 to provide sound for the entertainment system.

As mentioned above, software running on the microprocessor is used to control the entertainment functions. Figures 8 to 15 show the software flow diagrams as well as illustrate the various user controls for selecting between and controlling the individual entertainment components. Starting at block 100 at Figure 8, and proceeding immediately to block 102, the user is requested to input a selection for the type of entertainment that is desired. That is, television, AM/FM radio, CD-ROM, or VCR.

Figure 9 shows an example of a graphical selection screen that may be displayed for the user to pick from. In this example, the television has been selected by marking the box 104 adjacent to the television selection. If at this point if it is desired to exit the entertainment system, the down arrow 106 may be selected. Selections may be made by the user by, for example, key-stroke, mouse, trackball, or (or track point in IBM Thinkpad notebook computer), touch screen, or any other input means.

Referring back to Figure 8, if the down arrow of Figure 9 had been chosen, the software would exit at block 106. Similarly, if the television had been selected the flow diagram proceeds to block 108 and displays the television operation window at block 110. If the AM/FM radio had been selected then proceed to block 112 and display the AM/FM radio operation window at block 114. If the CD-ROM drive had been selected then proceed to block 116 and display the CD-ROM operation window at block 118. Finally, if the VCR had been selected then proceed to block 120 and display the VCR operation window at block 122.

Figure 10 shows an example of the television operation control window 124 and television picture window 126 opened on the computer display screen 21. It is noted that an application program may be simultaneously running and displayed in the background display. The television operation window 124, as well as all of the other operation windows described below, is a graphical interface showing the traditional controls that one would find on a conventional television including contrast 130, brightness 132, and volume controls 134. A mouse or track-point may be used to drag the control arrows 136 to adjust these controls. A channel tuner 126 is used to change the television channel. The user simply cursors to the tuner 126 and types in a television channel number. Similarly, the arrow icons located on either side of the tuner 126 may be used to increment or decrement the channel selection by clicking on the arrow icons. Likewise, channels may be scanned by clicking on the scanning icons 128. The television audio can either be sent to a speaker or to an earplug by clicking on the respective icons 138 or 140. A preset icon 142 may also be displayed for resetting all of the controls to a default setting.

The flow diagram shown in Figures 11A and 11B illustrate the steps taken when the television is selected and continue from block 200 in Figure 8. At block 202 the default size of the television picture, 126 from Figure 10 is set. At decision block 204 if the user has previously preset parameters, such as locked-in channels for a particular viewing area, those preset parameters are observed at block 206 and the preset television channel is displayed at block 208. If, on the other hand, at decision block 204 it is determined that there are no preset parameters, then an auto tuning function may take place where all of possible channels are scanned for activity and those which are determined active are locked, the default picture parameters are set at block 210 and the picture is again displayed at block 208.

Referring now to Figure 11B, and continuing from block 212 at decision block 214, the user inputs such as channel tuning, channel scanning, volume, brightness and contrast are read from screen 124. If such an input is detected, then the input is read at 216 and the requested operation is performed at 218. The routine is then returned to the top of decision block 214.

Figure 12 shows an example of an AM/FM radio operation window 302 opened on the computer display screen 21. The AM/FM radio operation window 302 is a graphical interface showing the traditional controls that one would find on a typical AM/FM radio including AM/FM band selector 304, volume controls 306, tuner 308, scan controls 310, speaker 312 or ear phone 314 controls and a preset button 316. Again, a mouse or track-point may be used to drag the control arrows 136 to adjust these controls.

The flow diagram shown in Figure 13 illustrates the steps taken when the AM/FM radio is selected and continue from block 300 in Figure 8. Proceeding to decision block 320, it is determined if there are any preset parameters for the controls shown in Figure 12. If yes, the preset parameters are observed at block 322. If no, the default parameters are set at block 324. At decision block 326 if any user inputs are detected, then the inputs are read at block 328 and the operation input from the AM/FM radio operation window 302 is performed at block 330.

Figure 14 shows an example of the VCR/CD-ROM operation window 402 opened on the computer display screen 21. The VCR/CD-ROM operation window 402, is a graphical interface shared for both the VCR functions and the CD-ROM functions and the user selects between the two by clicking on either the VCR box 404 or the CD-ROM box 406. The television display window 408 as well as the contrast control 410, brightness control 412, volume control 414, speaker or ear phone selection icon 416 and 418 and presets are analogous to those described above with reference to the television operation window 124 shown in Figure 10. In addition, icons for traditional controls that one would find on a typical VCR or CD-ROM player including play 422, rewind 424, stop/eject 426, fast forward 428, and pause 430 are included. A mouse or track-point may be used

to drag the control arrows 136 to adjust these controls.

Figure 15 shows a flow diagram to illustrate the steps taken when the CD-ROM is selected and continue from block 400 in Figure 8. At block 402, the type of operation is read from the user input obtained from the VCR/CD-ROM operation window 402, such as, for example, play, stop/eject, next, select, pause, fast-forward, reverse, speaker, select side A/B, exit, and the like. At decision block 403, user inputs selections from block 402 are detected and, accordingly, in block 404 the user input operation is performed.

Figure 16 shows a flow diagram to illustrate the steps taken when the VCR is selected and continue from block 500 in Figure 8. At block 505 the type of operation is read from the user input obtained from the VCR/CD-ROM operation window 502, such as, for example, play, stop/eject, next, select, pause, fast-forward, rewind, speaker, and the like. At decision block 504, user inputs selections from block 502 are detected and, accordingly, in block 506 the user input operation is performed.

While the invention has been described in terms of a single preferred embodiment, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.

Claims

1. An entertainment system integrated into a portable computer, comprising:

at least one of a television receiver (1) and a radio receiver (4); and
a built-in antenna (5) mounted to said portable computer for providing broadcast signals to one of said television receiver and said radio receiver.

2. An entertainment system integrated into a portable computer as recited in claim 1 further comprising:

at least one modular slot adapted to fit one of a floppy diskette drive (13), a hard-disk drive (14), a compact disk-read only memory (CD-ROM) drive (8), and a video cassette recorder (VCR) (7).

3. An entertainment system integrated into a portable computer as recited in claim 2 wherein said antenna is a telescoping antenna extending from a display lid of said portable computer.

4. An entertainment system integrated into a portable computer, as recited in claim 3 wherein said telescoping antenna is in the form of rabbit ears.

5. An entertainment system integrated into a portable computer as recited in any one of claims 2 to 4, fur-

ther comprising a keyboard which is hinged to provide access to said modular slot.

6. An entertainment system integrated into a portable computer as recited in any one of claims 1 to 5 wherein at least one of said television receiver and said radio receiver are housed in a display lid of said portable computer.

7. An entertainment system integrated into a portable computer as recited in claim 1 wherein said antenna and at least one of said television receiver and said radio receiver are built into a display lid.

8. An entertainment system integrated into a portable computer, as recited in claim 2 wherein one of said television receiver and said radio receiver, said compact disk-read only memory (CD-ROM) drive, and said video cassette recorder (VCR) are controlled through user-interface graphic screen displays having icons which mimic conventional controls of a television receiver, radio receiver, compact disk-read only memory (CD-ROM) drive, and video cassette recorder (VCR), respectively.

9. An entertainment system integrated into a portable computer according to any one of claims 2 to 8, wherein said portable computer comprises a built-in microprocessor (10), built-in audio circuit (6), and built-in video display circuit (2) connected to said microprocessor via a system bus (9),

and wherein said television receiver, said AM/FM receiver, and said modular slot are connected to said system bus for communicating, under software control of said microprocessor, audio signals to said built-in audio circuit and video signals to said built-in video display circuit.

10. An entertainment system integrated into a portable computer, as recited in claim 9 wherein said built-in audio circuit comprises an audio mixer for selecting an audio input from one of said television receiver, said AM/FM radio receiver, said compact disk-read only memory (CD-ROM) drive, and said video cassette recorder (VCR) and supplying an audio output to one of an ear phone jack and a power amplifier and speaker.

11. An entertainment system integrated into a portable computer, according to claim 10 wherein said television receiver and said compact disk-read only memory (CD-ROM) drive, and said video cassette recorder (VCR) share a common video display circuit.

12. An entertainment system integrated into a portable computer comprising a plurality of control icons controllable by a user input and fashioned to mimic conventional controls of a television receiver,

AM/FM radio receiver, compact disk-read only memory (CD-ROM) drive, and video cassette recorder (VCR), comprising:

function controls for allowing a user to select
one of a television receiver, a radio receiver, a
compact disk-read only memory (CD-ROM)
drive, and an video cassette recorder (VCR);
picture controls for controlling the attributes of
a television picture window open on a display
screen of said portable computer, said picture
controls comprising a contrast control and a
brightness control;
audio controls for controlling the attributes of
an audio output, said audio controls comprising
a volume control, a speaker selector and an
ear plug selector; and
mode controls for controlling said compact
disk-read only memory (CD-ROM) drive, and
said video cassette recorder (VCR), said mode
controls comprising a play icon button, a
stop/eject icon button, a fast-forward icon but-
ton, a rewind icon button, and a pause icon but-
ton.

13. An entertainment system integrated into a portable
computer as recited in claim 12 wherein said user
input is one of a mouse input and a track-point
input.

14. An entertainment system integrated into a portable
computer as recited in claim 13 wherein said con-
trast control, said brightness control, and said vol-
ume control are icons which can be dragged with
said one of a mouse input and a track-point input
from a minimum position to a maximum position.

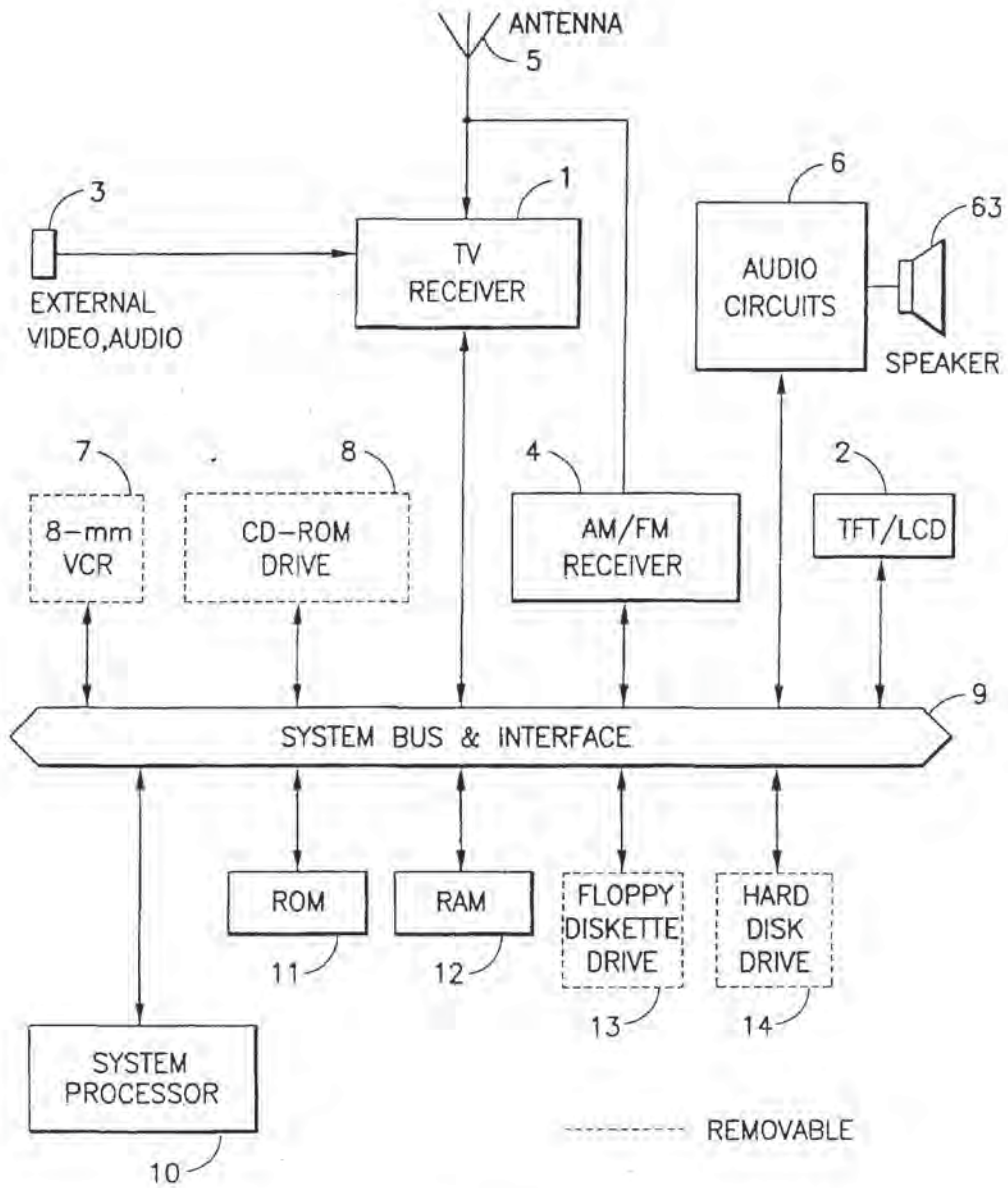


FIG. 1

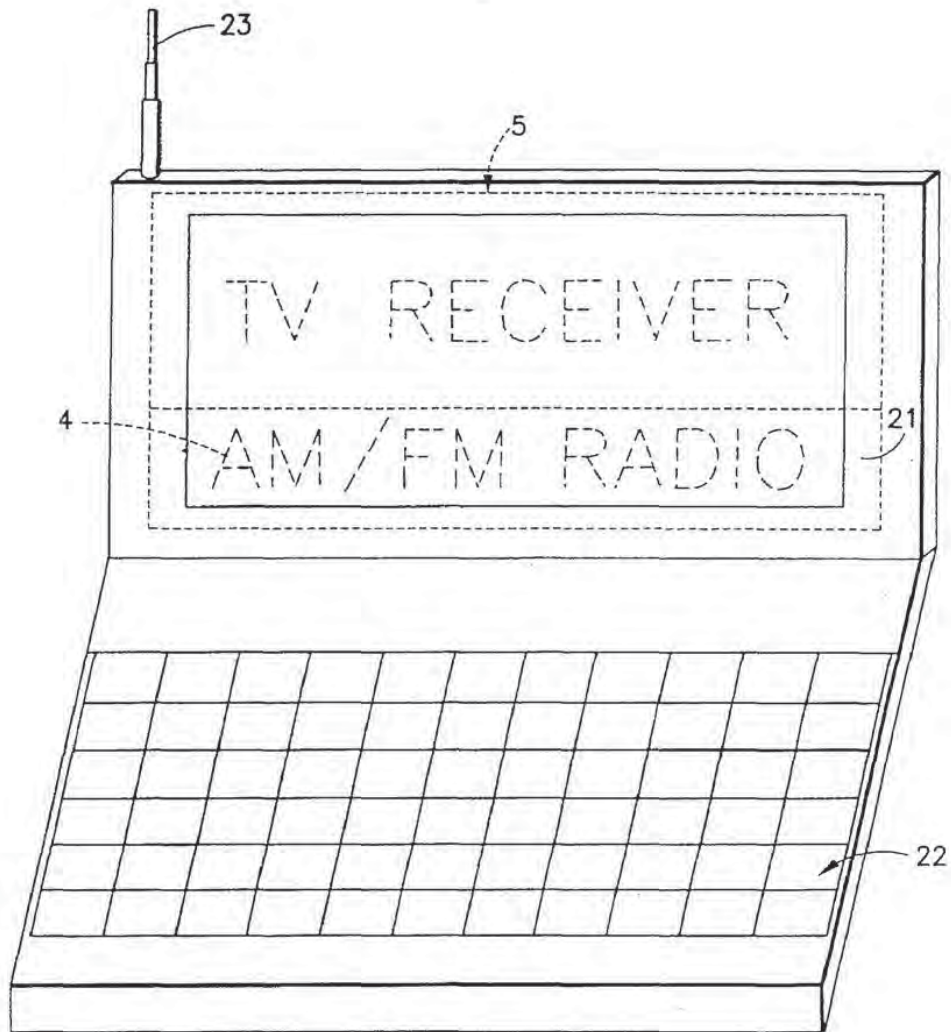


FIG. 2

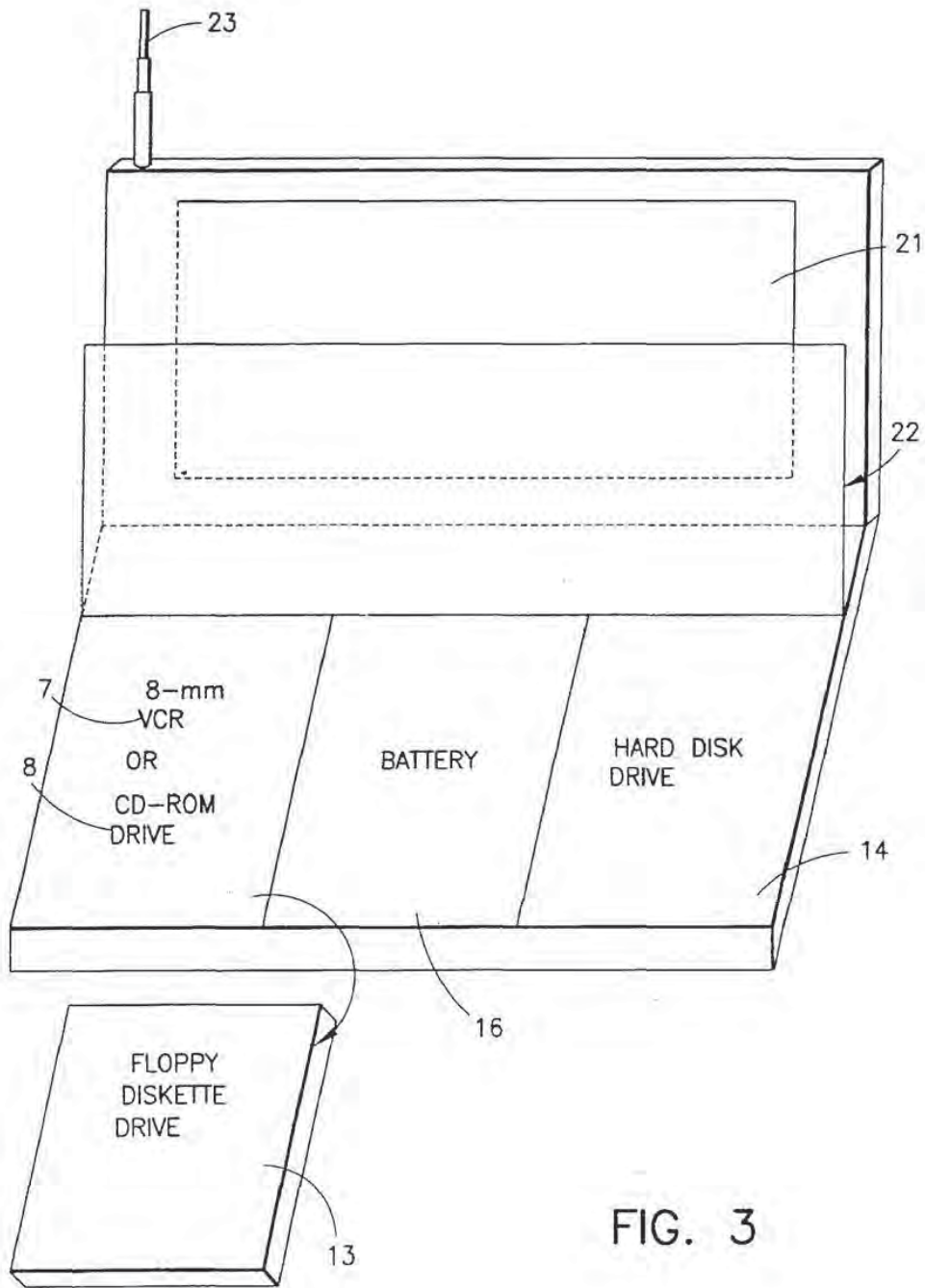
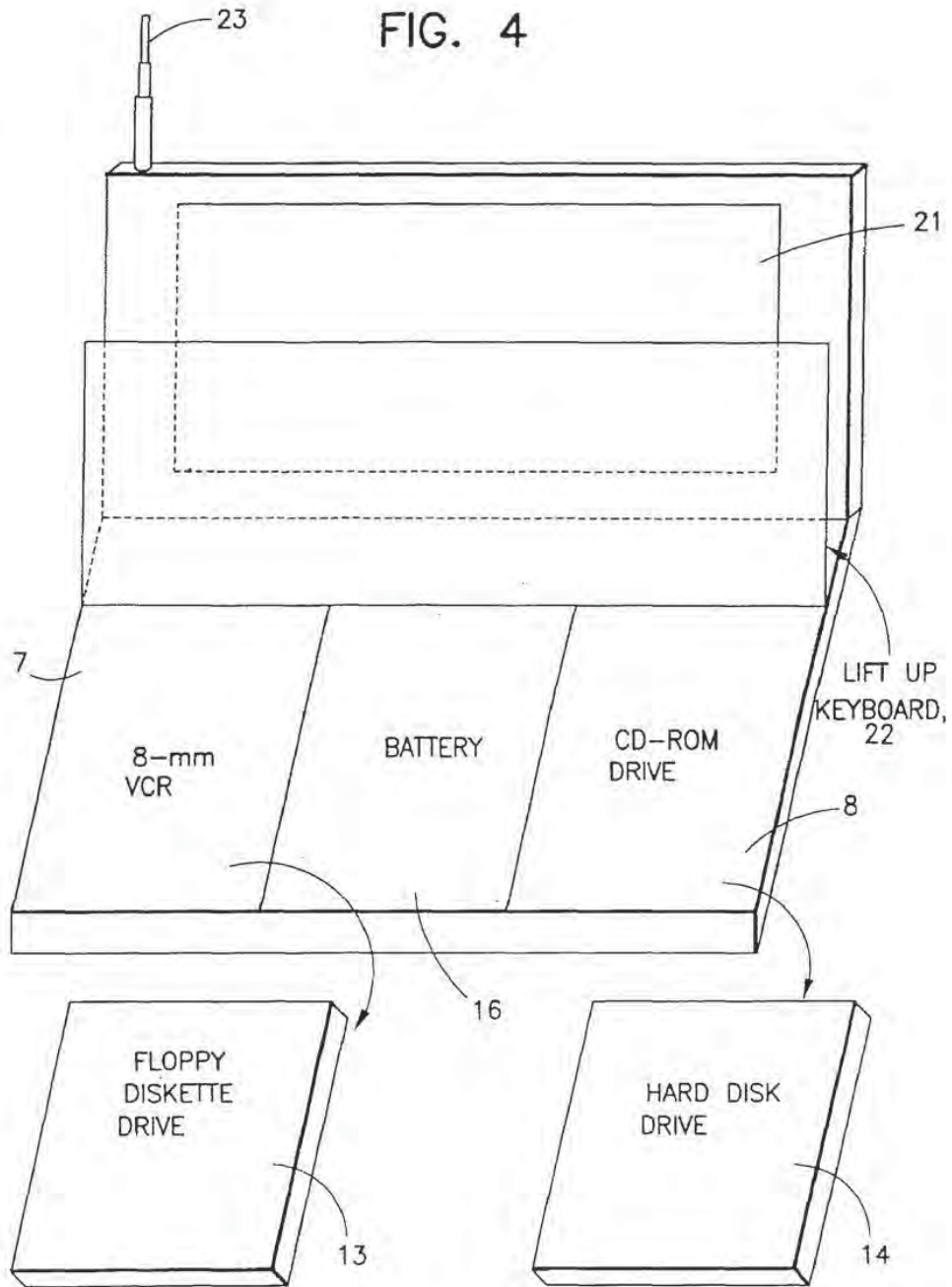
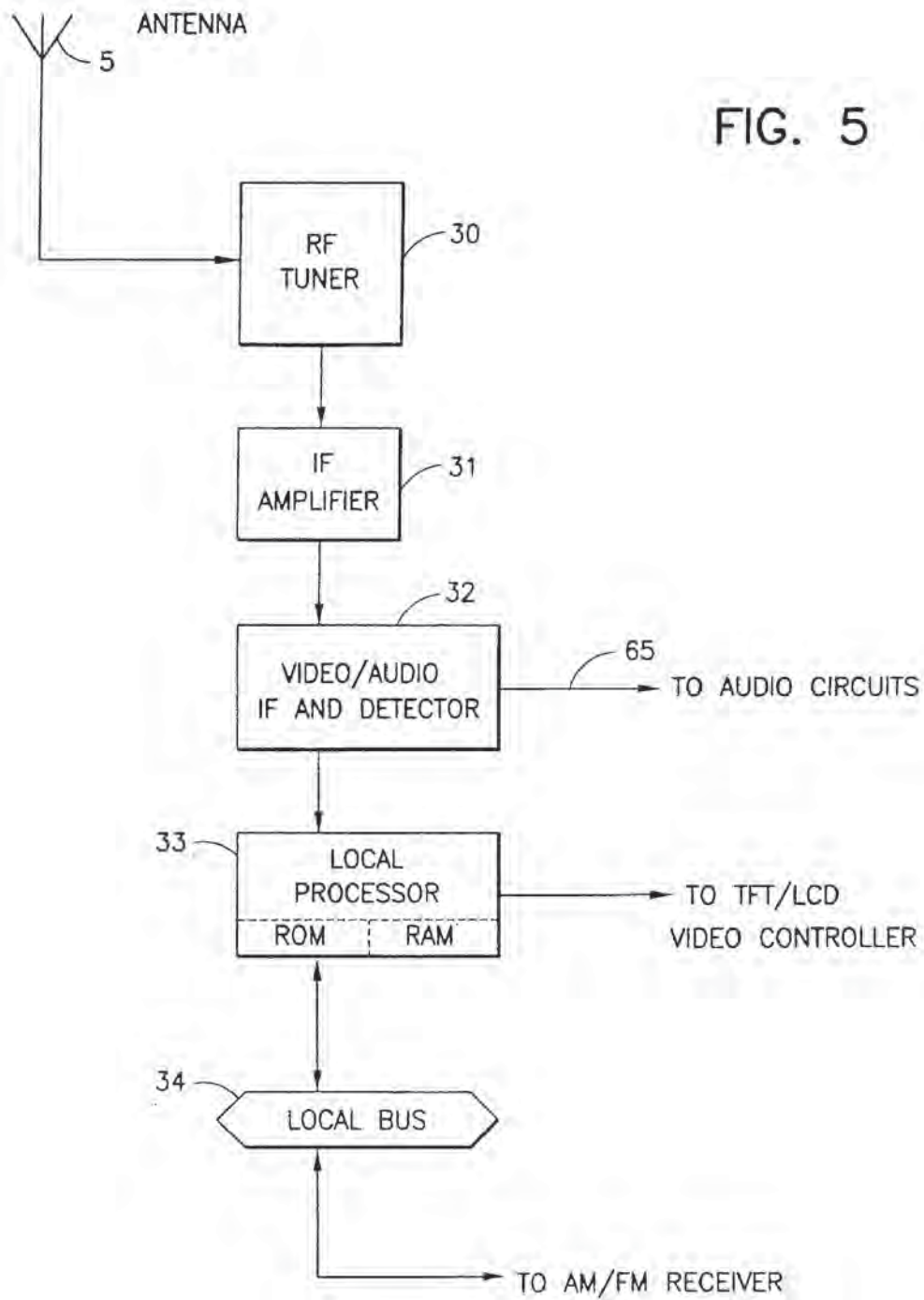


FIG. 3

FIG. 4





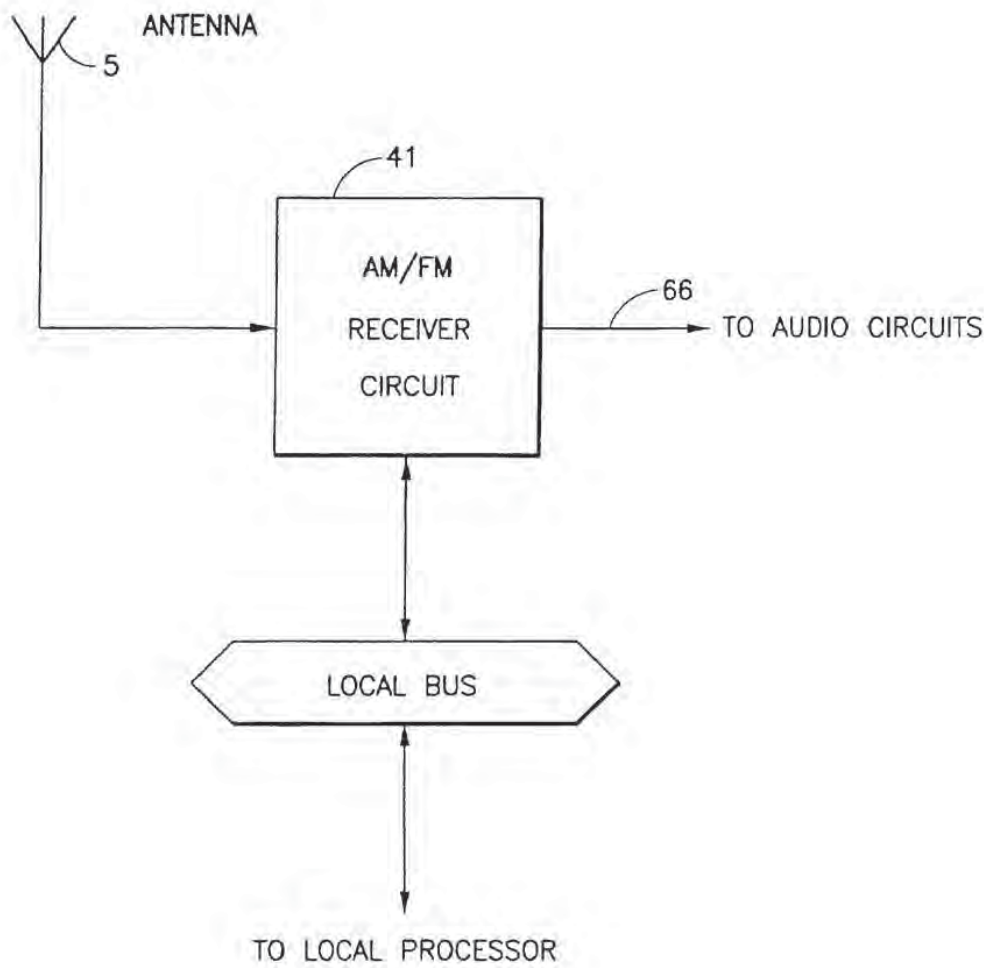


FIG. 6

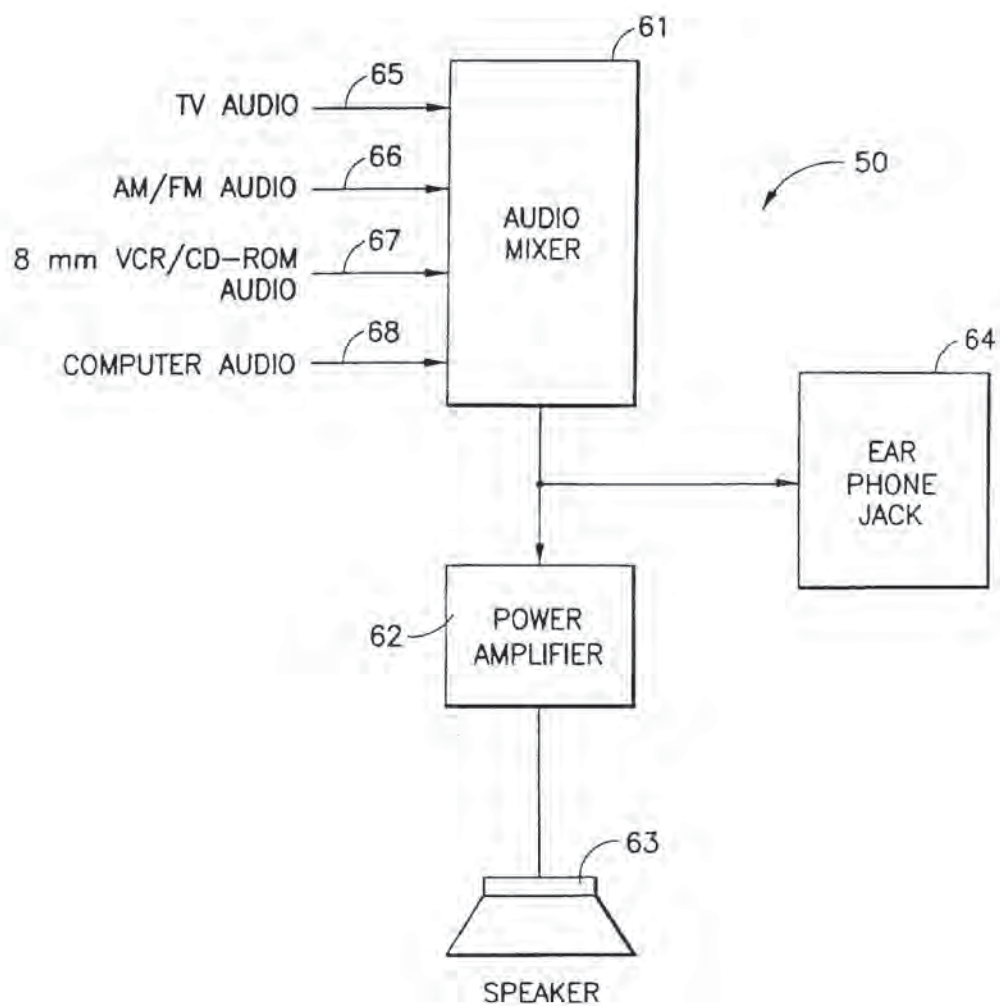


FIG. 7

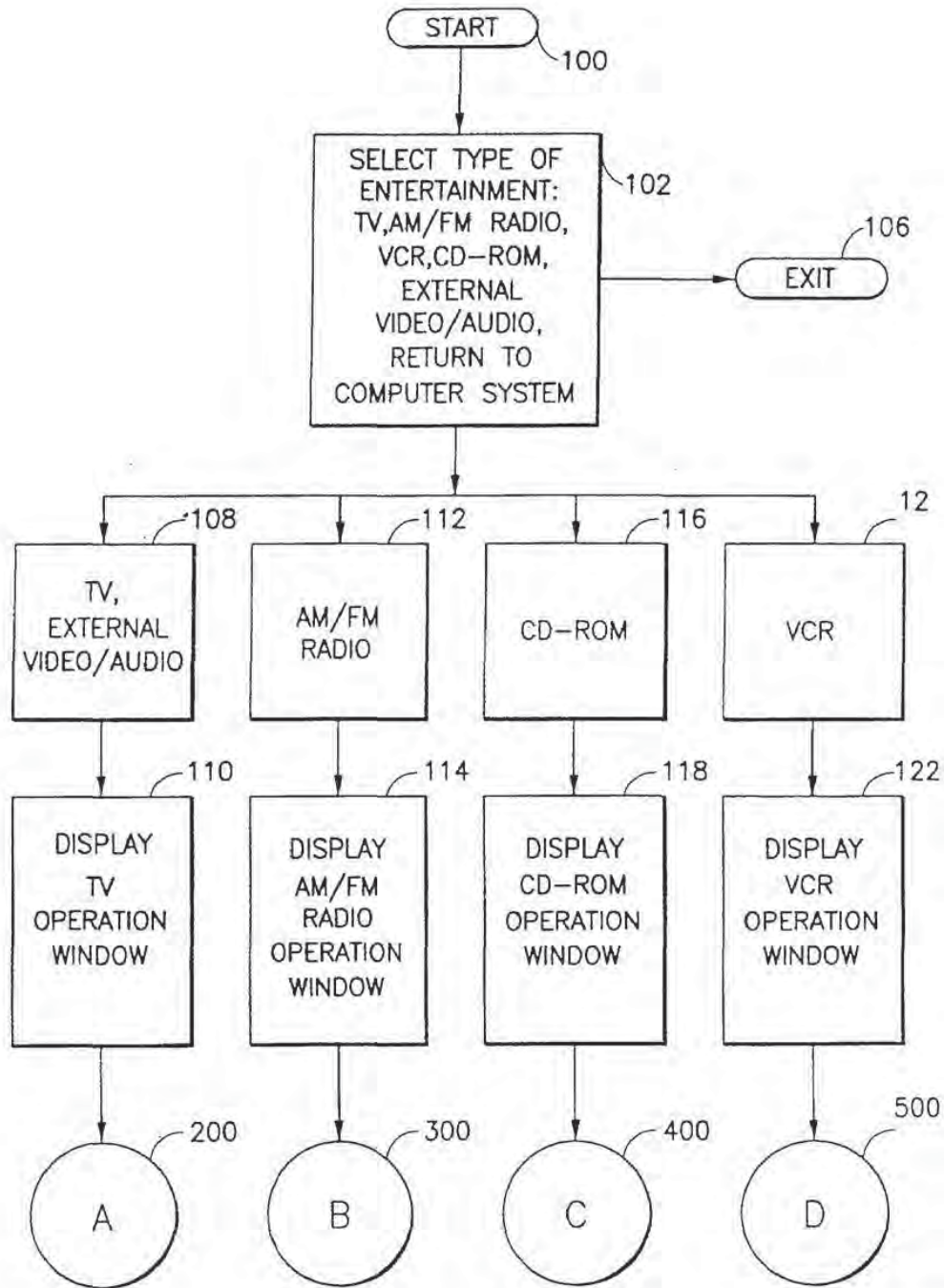
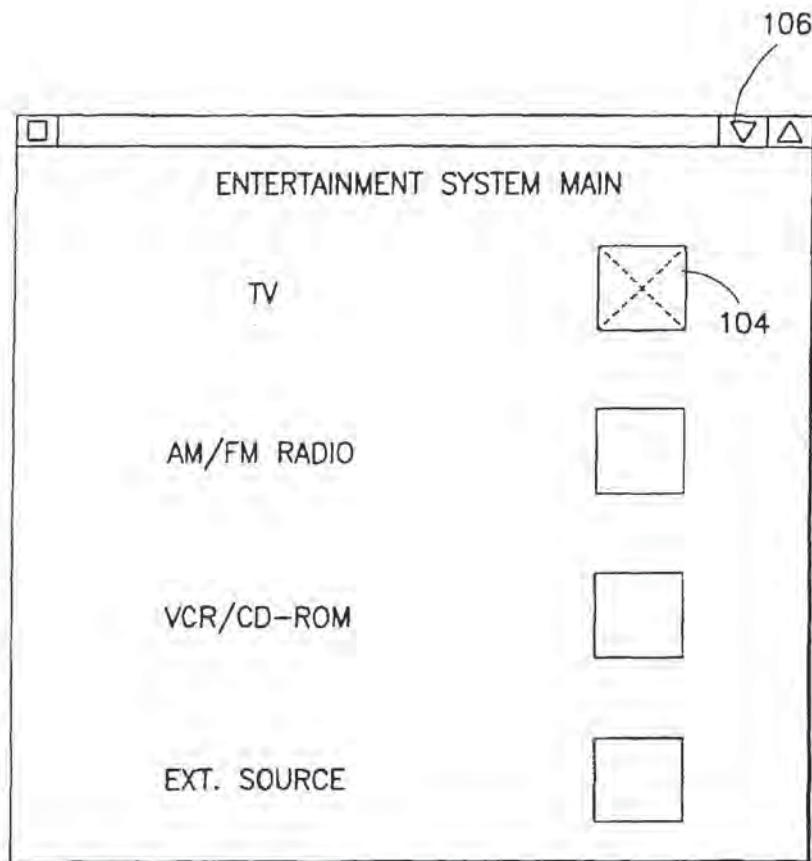
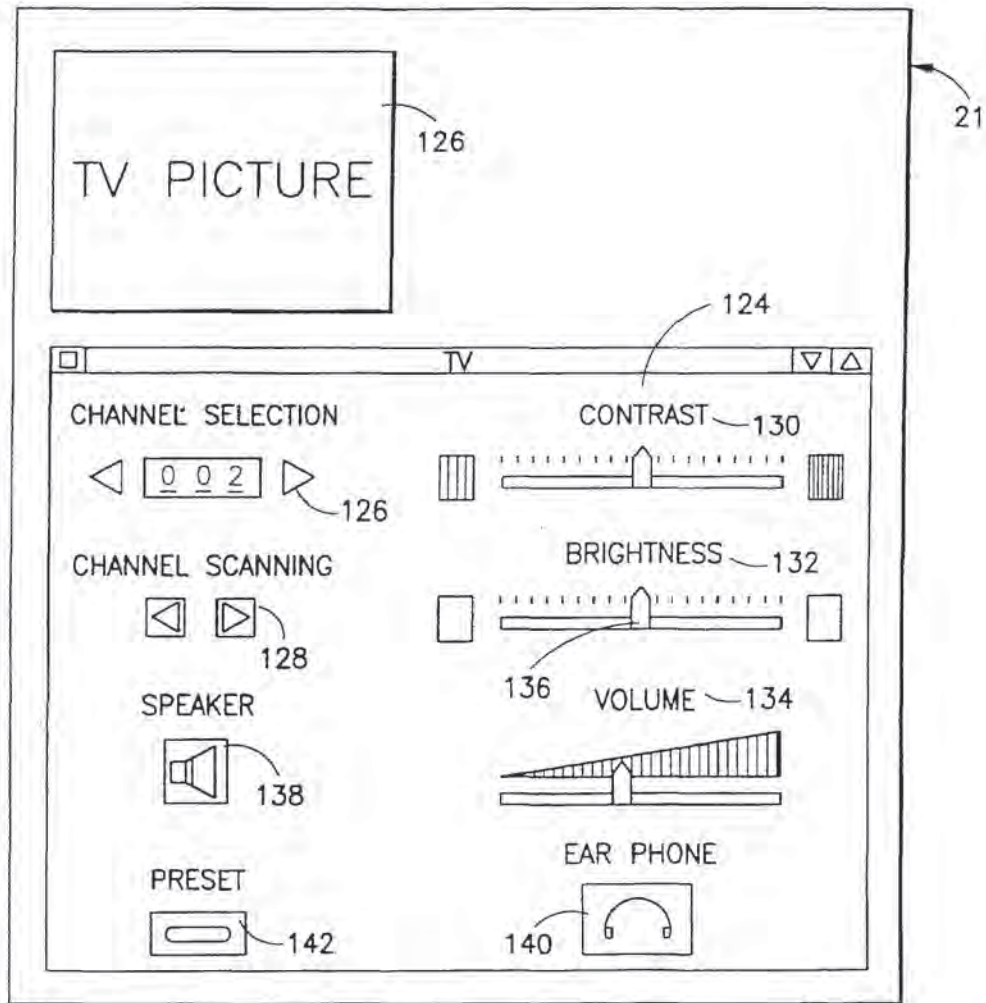


FIG. 8



ENTERTAINMENT SYSTEM MAIN SCREEN

FIG. 9



TV SCREEN
FIG. 10

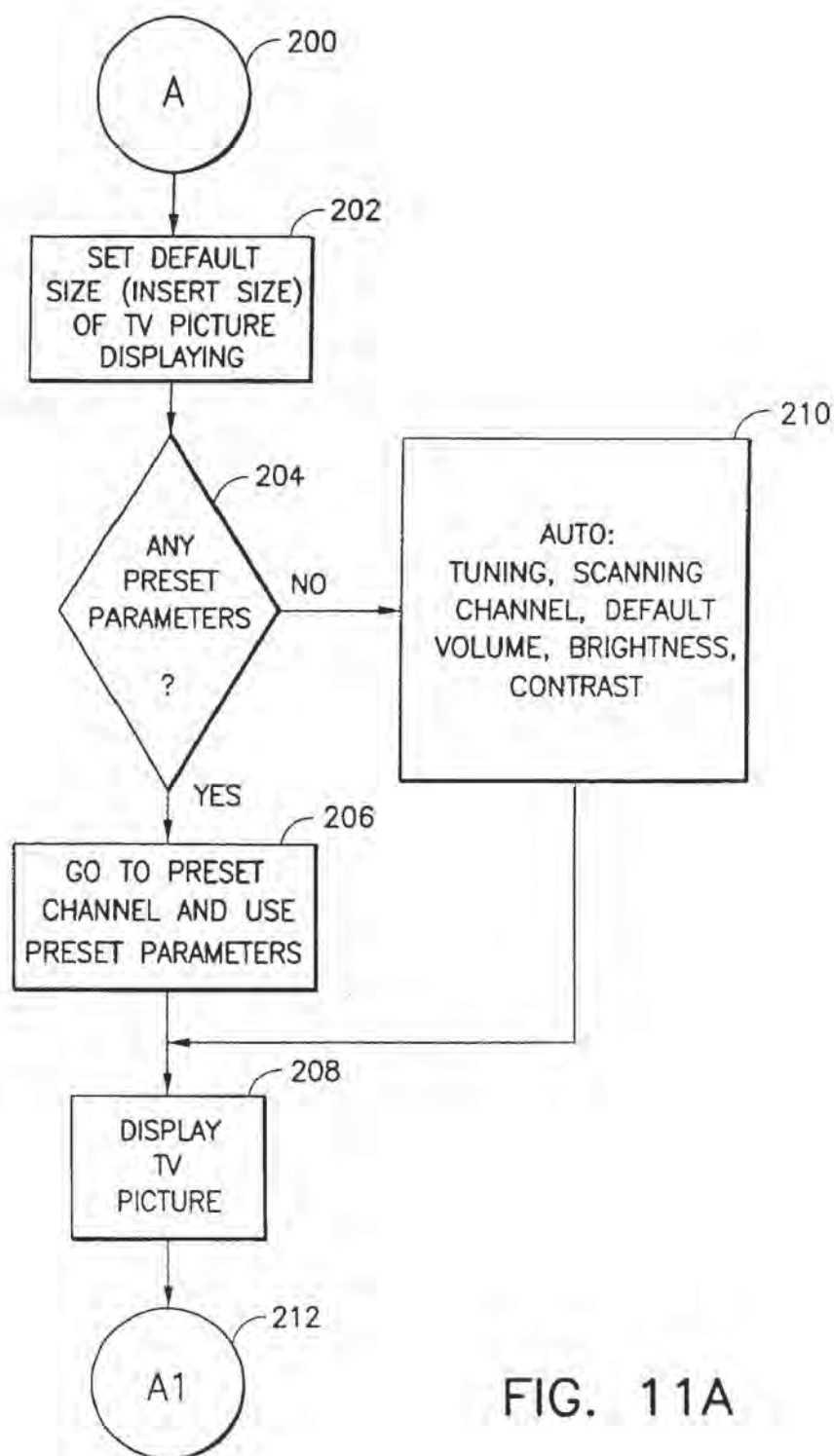
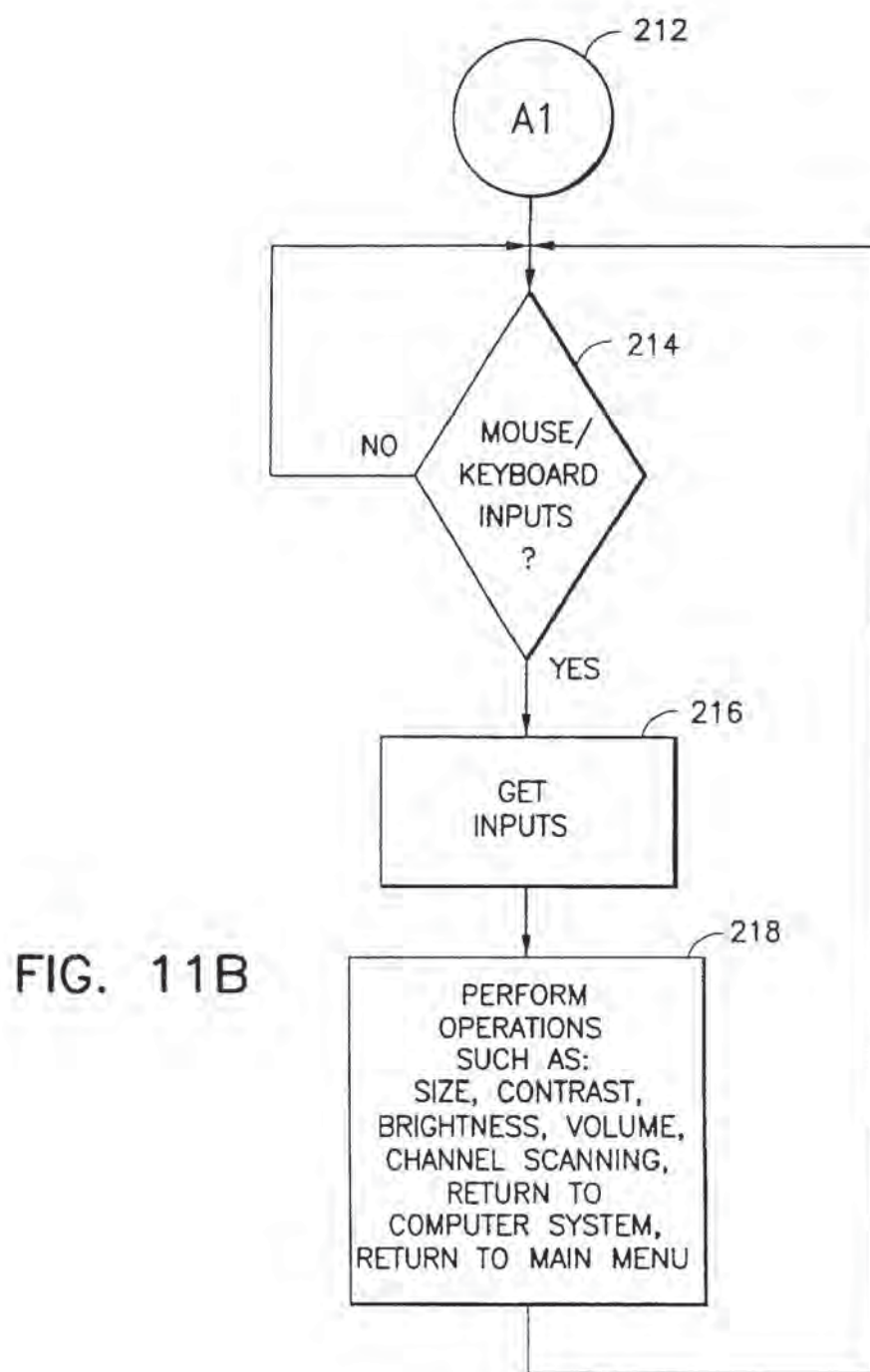
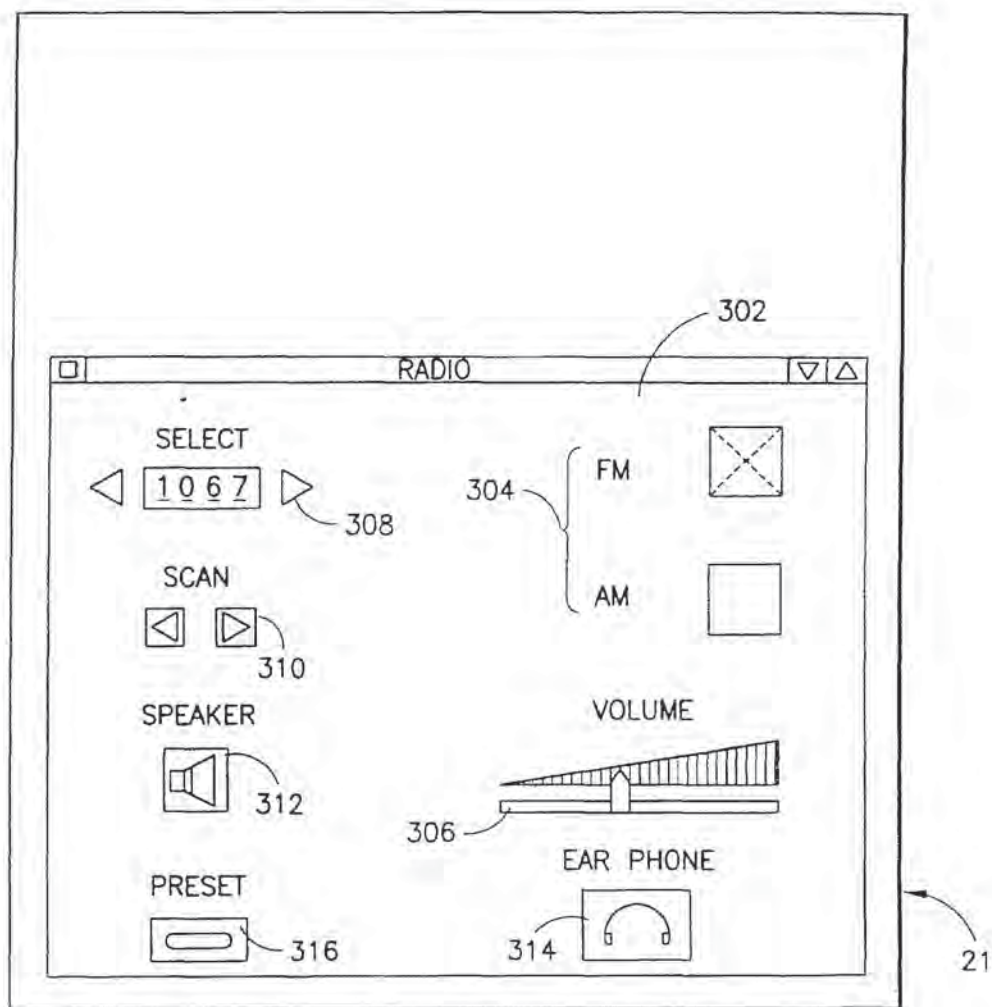


FIG. 11A





RADIO SCREEN
FIG. 12

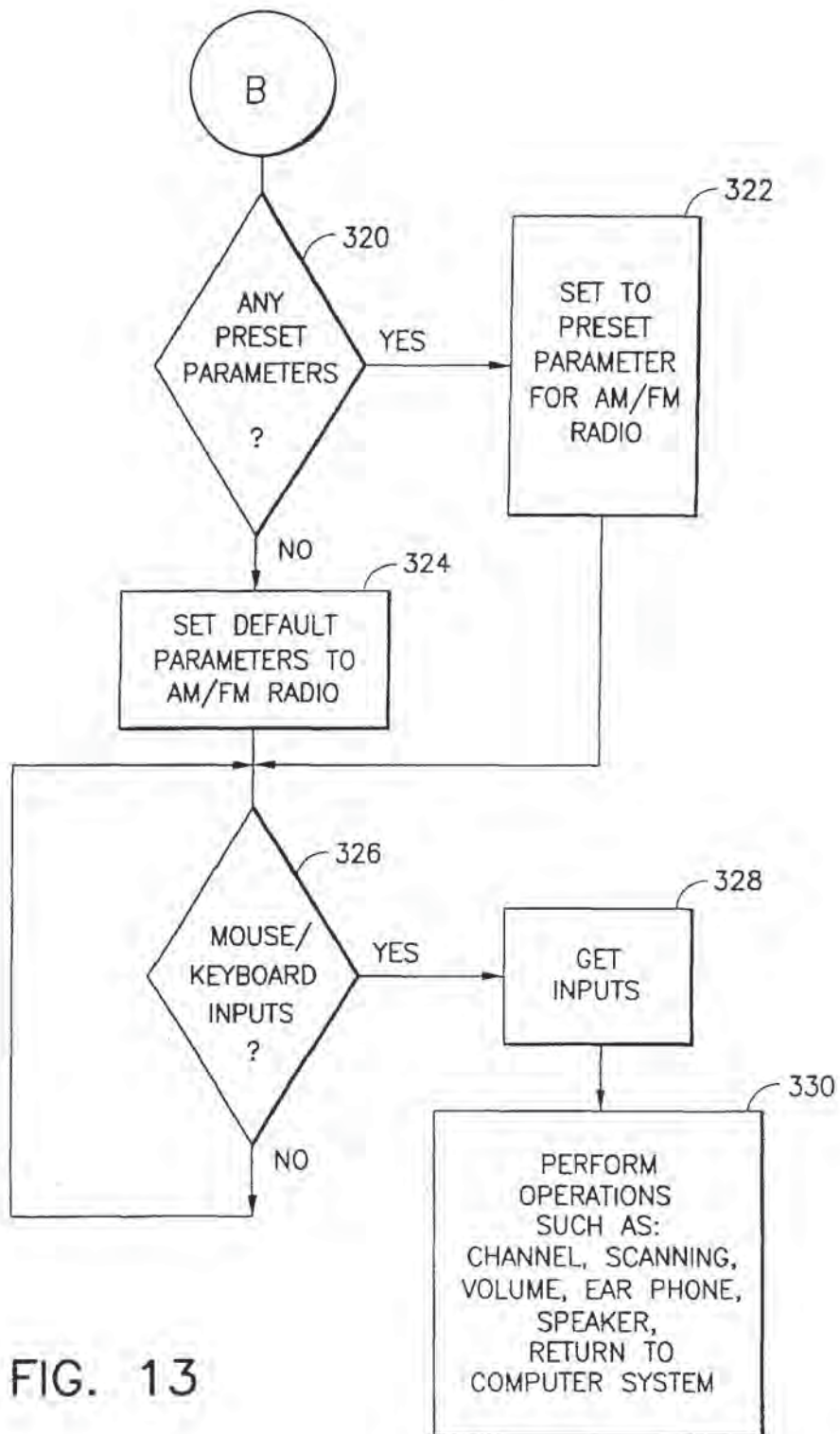
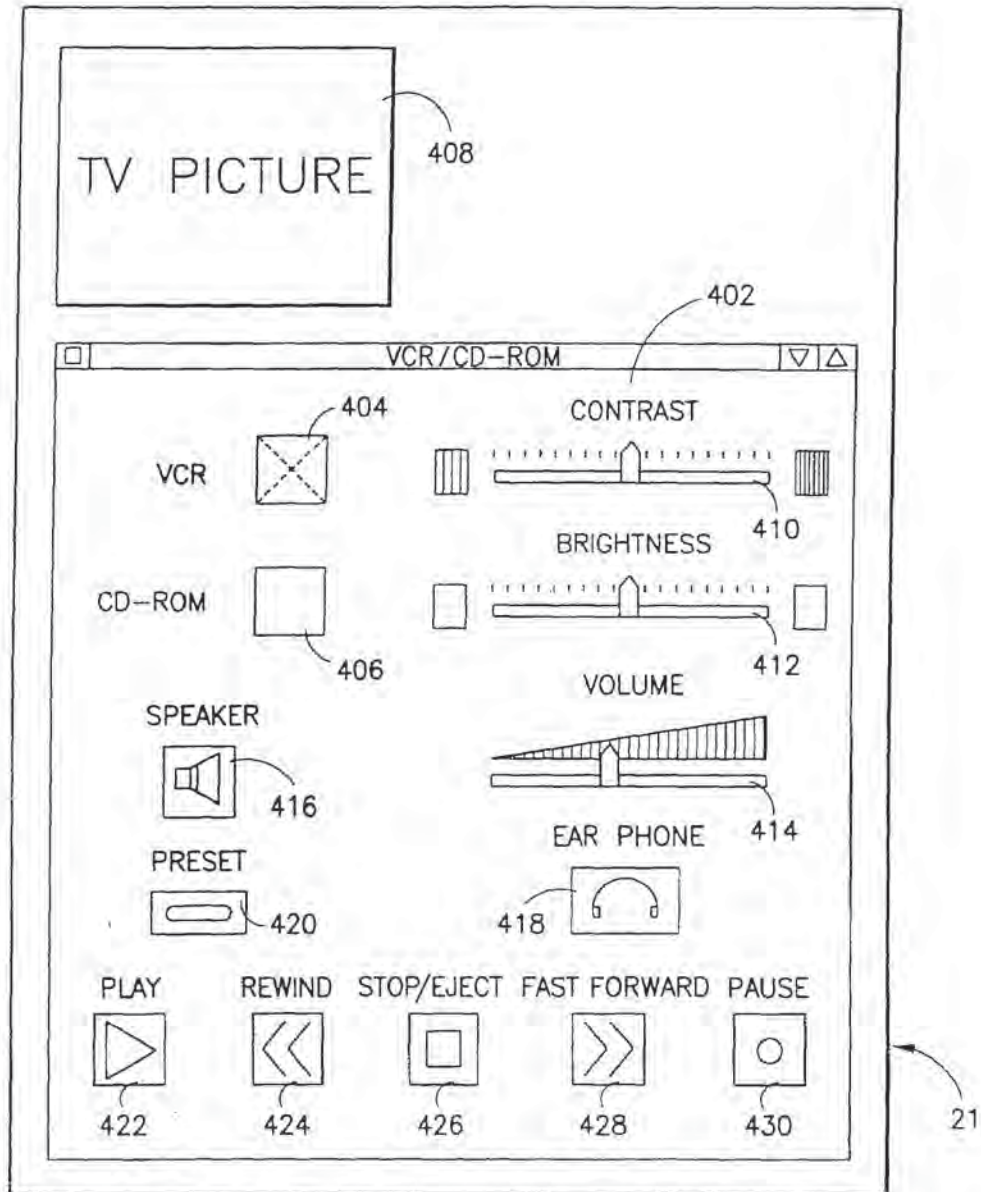
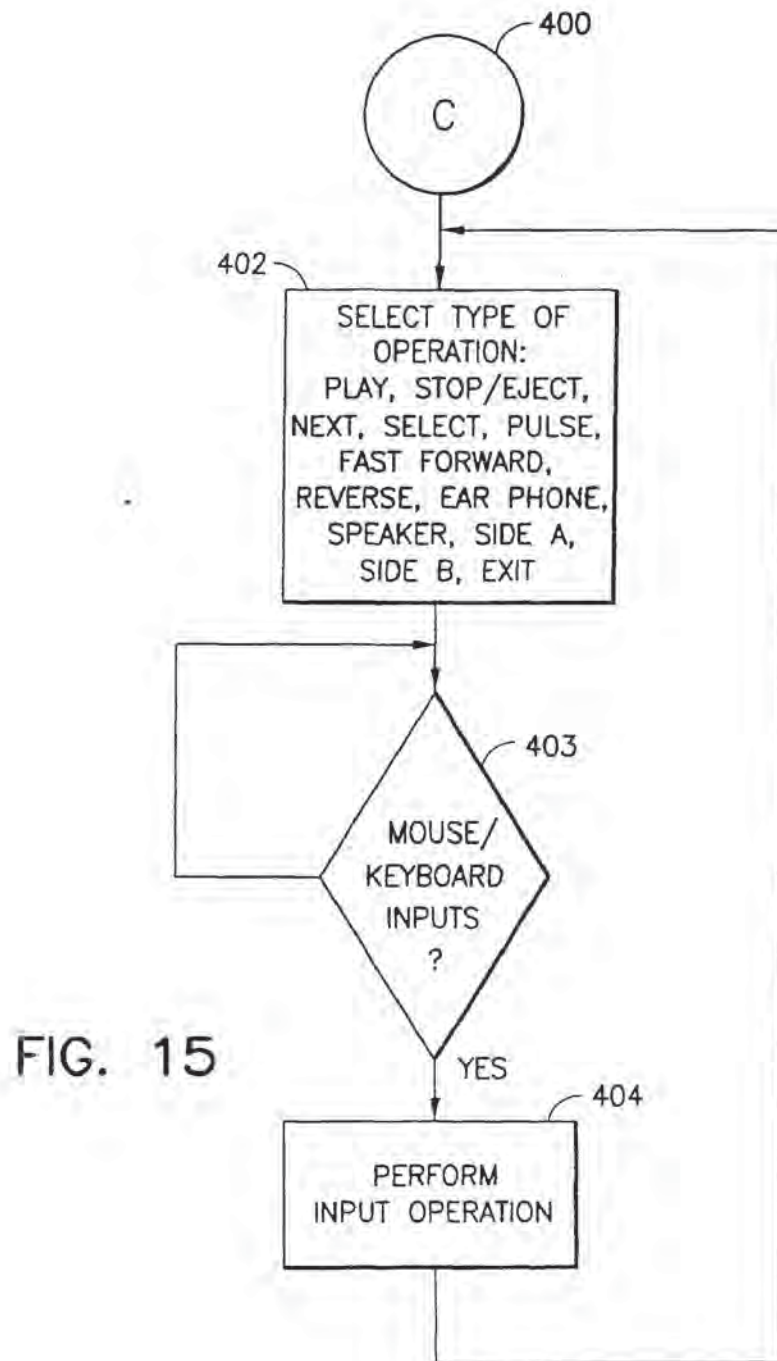


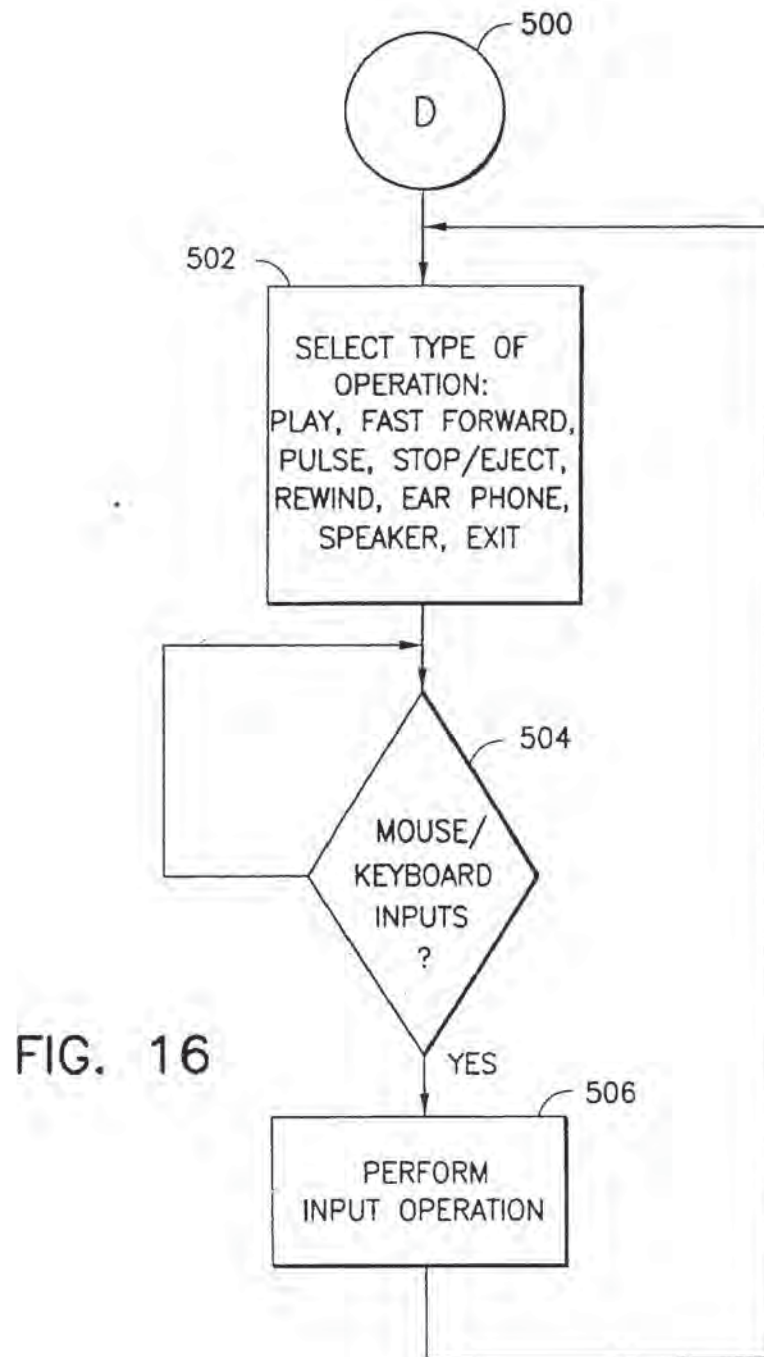
FIG. 13



VCR/CD-ROM SCREEN

FIG. 14





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⑪ 特許出願公開

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Z-7177-5D

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⑮ 発明の名称 可搬型VTR収納装置

⑯ 特 願 昭59-254028

⑰ 出 願 昭59(1984)12月3日

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明 細 書

1 発明の名称 可搬型VTR収納装置

2 特許請求の範囲

チューナに可搬型VTRを収納する収納孔を形成し、この収納孔に摺動可能に収納ガイド体を設け、この収納ガイド体に前記チューナと可搬型VTRの電気的接続をする端子を固定し、前記収納ガイド体のチューナ外方への移動時に、可搬型VTRの一部が収納孔より突出するように構成したことを特徴とする可搬型VTR収納装置。

3 発明の詳細な説明

〔発明の利用分野〕

本発明は、可搬型VTRとチューナとの組合せ体に係り、特に、可搬型VTRの収納装置に関する。

〔発明の背景〕

従来より、実公昭55-13766号公報、実公昭56-55765号公報にみられるように、電子機器本体にカセットテープレコーダあるいは記録再生装置を着脱自在に設けるものがあるが、本発

明に係る可搬型VTRとチューナとの組合せ体にあつては、セット基体に可搬型VTRとチューナとを独立して搭載するもの、あるいは可搬型VTRとチューナの一部を直接連結するものがあった。

しかしながら、上記従来装置では、可搬型VTRをチューナより取外すと、このVTRが位置していた面所が外部に露呈し、コネクタなどの部品が露出することになり、保守面からも外觀上からも好ましいものでなかった。

〔発明の目的〕

本発明の目的は、上記従来技術の問題点を解消し、容易かつ確実に可搬型VTRをチューナ内に挿入でき、しかもチューナからの取外も容易にできるようにした可搬型VTR収納装置を提供するにある。

〔発明の概要〕

この目的を達成するために、本発明は、チューナに可搬型VTRを収納する収納孔を形成し、この収納孔に摺動可能に収納ガイド体を設け、この収納ガイド体に前記チューナと可搬型VTR

の電気的接続をする端子を固定し、前記収納ガイド体のチューナ外方への移動時に、可搬型VTRの一部が収納孔より突出するように構成した点に特徴がある。

〔発明の実施例〕

以下、本発明の実施例を図面を用いて説明する。

図は本発明の可搬型VTR収納装置の一実施例を示すものであって、1はチューナのフレーム、1a,1bはフレーム1に形成した凸部、1c,1d,1e,1fはフレーム1に形成したボス、1g,1hはフレーム1に形成した孔、1i,1jは孔1g,1hの側面、2は収納ガイド体、2aはガイド体2のボス、2bはガイド体2の凸部、2c,2dはガイド体2の折曲部分、3はアーム、3a,3bはアームに形成した孔、3cはアーム3に形成した凸部、4はスプリング、5はロックアーム、5aはロックアーム5の中心孔、5b,5cはロックアーム5に形成した凸部、6は操作スライダ、6a,6bは操作スライダ6に形成した長孔、6c,6dは操作ス

遊嵌し、ボス1e,1fをガイドとしてX-Y方向に移動可能であり、前記ロックアーム5の凸部5cと凸部6cとを係合し、またイジェクトアーム7の凸部7dと凸部6dを係合させている。前記イジェクトアーム7は、長孔7aをボス1cに係合し、凸部7bを操作スライダ6の凸部6dと係合し、さらに凸部7d,7eをフレーム1の凸部1iと係合させ、ボス1e、凸部1jをガイドとしてX-Y方向に移動可能である。

また、チューナの本体9の前面に開口を有し、この開口からフレーム1の内方、すなわちX-Y方向に収納孔9aを形成し、この収納孔9aに前記収納ガイド体2がX-Y方向に移動可能に設けられることになる。そして、この収納孔9aに、前面に磁気記録テープ収納部及び操作部材を設けた可搬型VTR10を収納するのである。

次に、上記構成の実施例による可搬型VTR10の収納操作を説明する。第2図に示すように、チューナの本体9の収納孔9aの開口から可搬型VTR10を後面10fより矢印方向へ挿入する。こ

ライダ6に形成した凸部、7はイジェクトアーム、7aはイジェクトアームに形成した長孔、7b,7c,7dはイジェクトアーム7に形成した凸部、8は電気的接続端子、9はチューナの本体、9aは収納孔、10は可搬型VTR、11はVTR端子、12はボトムカバーである。

上記図面において、収納ガイド体2がその突出部にチューナ本体9と可搬型VTR10の電気的接続をする端子8を固定し、下部をフレーム1の下に配置し、フレーム1の孔1g,1hと折曲部分2c,2dの側面を接触させて収納孔9aの開口部から内方、図面上X-Y方向に摺動可能に設けられている。アーム3は、孔3aがボス2aに係合し、凸部3cがスプリング4の一端と係合し、さらにボス1eに遊嵌する孔3b部分を中心に回転可能となっている。ロックアーム5は、凸部2bが凸部5bと係合し、凸部5cが操作スライダ6の凸部6cと係合し、ボス1dに遊嵌する孔5a部分を中心に回転可能になっている。前記操作スライダ6は、フレーム1のボス1e,1fを長孔6a,6bに

の時、可搬型VTR10のVTR端子11がチューナの本体9の電気的接続端子8に結合し、可搬型VTR10と収納ガイド体2が一体となり、可搬型VTR10の前面10aが本体9の前面9dと同一位置になった時、収納ガイド体2の凸部2bがロックアーム5の凸部5bにてロックされて保持される。この時の可搬型VTR10が本体9に収納された状態を第3図に示す。この状態で、可搬型VTR10の端子11はチューナ本体9の電気的接続端子8に係合し、可搬型VTR10と本体9との間の電気的接続が図られる。

また、収納された可搬型VTR10をチューナ本体9より取出す操作は、第1図におけるイジェクトアーム7の凸部7cをX方向に押圧する。この押圧によりイジェクトアーム7の凸部7dが操作アーム6の凸部6dをY方向に押し、操作アーム6の凸部6cがロックアーム5の凸部5cを押して、ロックアーム5をフレーム1のボス1dを中心に反時計方向に回転させる。そして収納ガイド体2の凸部2bとロックアーム5の凸部5bの係

合が解除される。この時、収納ガイド体2のガス2aにスプリング4の弾性力がアーム3を介してY方向に作用しているため、可搬型VTR10と収納ガイド体2は一緒にY方向に移動し、収納ガイド体2の折曲部分2c,2dがフレーム1の側辺1f,1hと当接した位置で止まる。この時の移動量は、第4図に示すδである。

そしてチューナ本体9の前面9fより可搬型VTR10が突出したδの部分に引抜き力を加えて、チューナ本体9の端子8と可搬型VTR10の端子11の接続を解除することにより、可搬型VTR10を本体9より取出すことができる。

〔発明の効果〕

以上説明したように、本発明によれば、可搬型VTRをチューナ内部へ装填でき、しかもチューナからの取外しも容易であり、また取外し後も接続端子などが外部へ露呈することなく、保守面、外観上も好ましいものであって、上記従来技術の問題点を除いて優れた機能の可搬型VTR収納装置を提供することができる。

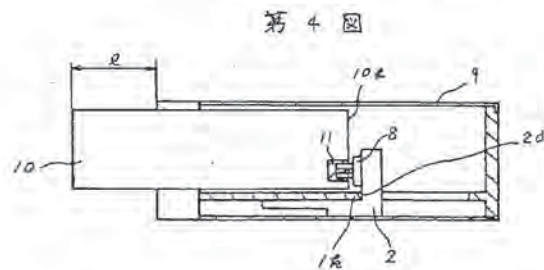
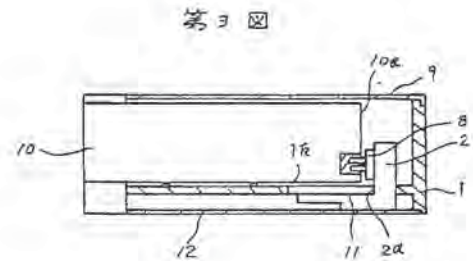
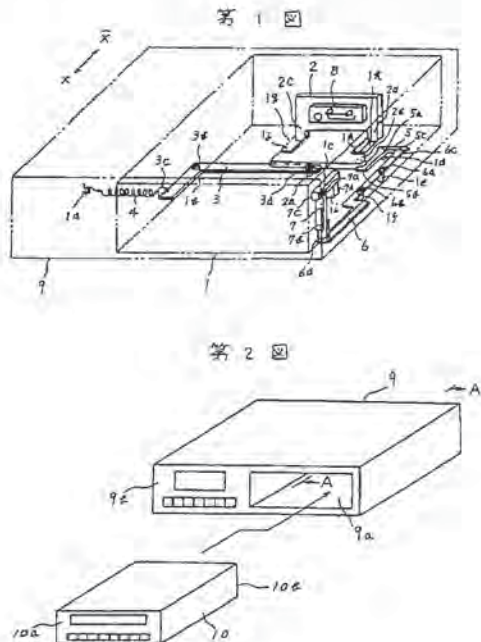
4 図面の簡単な説明

第1図は本発明による可搬型VTR収納装置の一実施例を示す説明用斜視図、第2図は同実施例の可搬型VTRのチューナへの挿入状態を示す斜視図、第3図、第4図は同実施例の可搬型VTRのチューナでの装着状態を示す第2図におけるA-A一部断面図である。

2…収納ガイド体、 8…端子、
9…チューナ本体、 9a…収納孔、
10…可搬型VTR。



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⑩ 日本国特許庁(JP)

⑪ 特許出願公開

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⑮ 発明の名称 ポータブル画像提示装置

⑯ 特 願 平1-89388

⑰ 出 願 平1(1989)4月7日

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明 細 書

1. 発明の名称

ポータブル画像提示装置

2. 特許請求の範囲

画像情報を圧縮し、量子化する手段と、

前記圧縮・量子化手段により圧縮・量子化され
た情報を符号化する手段と、

前記符号化手段により符号化された符号デー
タを記憶する着脱可能な記憶手段と、

前記記憶手段に記憶された符号データを読取る
手段と、

前記読取手段により読取られた符号データを復
号化する手段と、

前記復号化手段により復号化された情報を伸張
し原画像信号を作成する手段と、

前記作成手段により作成された原画像信号を画
像として提示する手段とを備えた、ポータブル画
像提示装置。

3. 発明の詳細な説明

〔産業上の利用分野〕

本発明は画像提示装置に関し、特にポータブル
タイプの画像提示装置に関する。

〔従来の技術〕

現在、ユーザがスケジュール、電話番号等のデ
ータを適宜記憶させ、かつ、これらのデータを適
宜取出すことのできる、いわゆるメモ機能を備え
たポータブルタイプの画像提示装置、すなわち、
電子メモが普及しつつある。このような電子メモ
は、一般に、ユーザが上記のような情報を入力す
るためのキーボードを含む。ユーザは、このキー
ボードから記憶させておきたいデータを入力する。
このようにして入力された文字データあるいは記
号データは所定の形式に変換され半導体メモリに
記憶される。さらに、ユーザがキーボードから所
定のキー入力を行なうことによって半導体メモリ
から所望のデータが自動的に読出され表示部に文
字あるいは記号として表示される。また最近では、
手書きの文字あるいは記号を入力することのでき
る電子メモも発表されている。

〔発明が解決しようとする課題〕

以上のように電子メモに代表される、現在実用化されているポータブル画像提示装置は、文字データおよび記号データのみしか記憶することができない。このため、ユーザは文字による説明だけでは理解し難い、地図、表、グラフ、デザイン、物の形状などのデータに関しては従来通り、これらを手帳等に手書きしておく必要があった。しかし、このような、文字や記号以外の複雑な画像データを記録でき、かつ、適宜取出すことのできる電子メモがあればさらに便利である。

本発明の目的は、上記のような課題を解決し、複雑な画像データを自由に取込み、かつ、必要に応じてこれらを自由に取出すことのできるポータブル画像提示装置を提供することである。

〔課題を解決するための手段〕

上記のような目的を達成するために、本発明にかかるポータブル画像提示装置は、画像情報を圧縮し、量子化する手段と、この圧縮・量子化手段により圧縮・量子化された情報を符号化する手段と、この符号化手段により符号化された符号デー

タを記憶する着脱可能な記憶手段と、記憶手段に記憶された符号データを読取る手段と、この読取手段により読取られた符号データを復号化する手段と、復号化手段により復号化された情報を伸張し原画像信号を作成する手段と、この作成手段により再生された原画像信号を画像として提示する手段とを備えた。

〔作用〕

本発明にかかるポータブル画像提示装置は、上記のように構成されているため、文字および記号以外の画像情報をも記憶手段に記憶させることができるとともに、記憶手段より適宜取出すことが可能となる。さらに、この記憶手段は本発明にかかる画像提示装置に脱着可能であるため、必要な画像情報を予め記憶させておき、必要に応じて装置本体に装着することができる。

〔実施例〕

図面は、本発明の一実施例を示すポータブル画像提示装置の概略ブロック図である。図を参照して、このポータブル画像提示装置は、本体部1と、

文字・記号データを含む画像データを記憶する記憶部2とを含む。記憶部2は、半導体メモリを内蔵し、本体部1と脱着可能なカートリッジ式（たとえばカードタイプ）である。

本体部1は、従来の電子メモのようなポータブル画像提示装置と異なり、家庭用テレビジョン、VTR（ビデオテープレコーダ）、ビデオカメラ等からの再生画像信号やコンピュータによるグラフィックス画像信号を取込む入力回路1と、入力回路1によって取込まれたアナログ画像信号を所定のデジタル形式の画像データに変換する変換部4と、変換部4からの画像データを記憶部2に出力する出力回路5とを含む。

変換部4は、A/D変換器41と、変換回路42と、量子化器43と、符号化器44とを含む。

入力回路1によって取込まれたアナログ画像信号は、変換部4において、まず、A/D変換器41に入力される。A/D変換器41は、入力回路1からのアナログ画像信号をデジタル化し変換回路42に出力する。変換回路42は、A/D変

換器41からのデジタル画像信号を直交変換し空間周波スペクトルに分解することによって、画像の相関性を利用し電力を低域成分に集中させる、直交変換回路である。次に、量子化器43は、変換回路42によって直交変換されたデジタル画像信号に、画像として重要な低域成分データを多くのビット数で表わし、高域成分データを少ないビット数で表わす非線形量子化を行なうことによって、データ圧縮を行なう。次に、符号化器44は、量子化器43によってデータ圧縮されたデジタル画像信号を可変長符号化し出力回路5に出力する。出力回路5は、以上のようにして得られた画像データを記憶部2に出力する。このようにして、家庭用テレビジョン、VTR、ビデオカメラ等による再生画像やコンピュータによるグラフィックス画像が記憶部2に記憶される。

本体部1は、画像を表示するための表示部9と、さらに、従来の電子メモのようなポータブル画像提示装置とは異なり、記憶部2に記憶されている画像データを読出す読出回路6と、読出回路6に

よって読出された文字および記号データ以外の画像データを元の画像信号に戻す再生部7と、再生部7からの画像信号に必要な処理を行ない表示部9に出力する映像回路8とを含む。表示部9は、たとえば液晶ディスプレイなどによる表示画面を有する。

読出回路6によって記憶部2から読出された文字および記号データ以外の画像データは、再生部7において、まず、復号化器71に入力される。復号化器71は、読出回路6からの画像データを復号し量子化復元器72に出力する。量子化復元器72は、復号化器7によって復号された画像データを量子化器4における圧縮特性の逆関数で変換することによりこれを伸張し、量子化器43によって圧縮される前のデジタル画像信号に戻す。次に、逆変換回路73が、量子化復元器72からのデジタル画像信号を、変換回路42によって直交変換される前の画像信号に逆変換するとともにアナログ化することによって、原画像信号に戻し映像回路8に出力する。映像回路8は、以上の

る。

本実施例においては、入力回路3を介して入力されたアナログ画像信号に対する一連の変換を1次元的に行なったが、入力回路3と変換部4との間にフィールドメモリ等の、情報を一時的に記憶させておく一時記憶部を設けて、入力回路3を介して入力されるアナログ画像信号を多次元的に所定の形式に変換してもよい。

さらに、このポータブル画像提示装置の本体部は、ユーザのキー入力によって文字および記号を入力するための文字・記号入力スイッチ10と、文字・記号入力スイッチ10へのキー入力に回答してキー入力された文字および記号の各々に対応する文字・記号パターンデータを出力回路5および表示部9に出力する文字・記号発生部11とを含む。文字・記号発生部11からの文字・記号パターンデータは、出力回路5を介して記憶部2に記憶されるとともに表示部9によって文字および記号として表示される。さらに、記憶部2に記憶された文字および記号データは読出回路6によ

うにして得られた原画像信号に、通常の受像機において行なわれるのと同様の処理を行なうことによって表示部9に良好な原画像を表示できる最終的な画像信号を作成し表示部9に出力する。表示部9は、映像回路8からの画像信号を画像として表示する。以上のようにして、表示部9に記憶部2に記憶されていた家庭用テレビジョン、VTR、ビデオカメラ等による再生画像やコンピュータによるグラフィック画像が提示される。

以上のように、このポータブル画像提示装置によれば、従来の電子メモ等のポータブル画像提示装置では不可能であった複雑な画像の記憶および再生が可能となる。

本実施例においては、入力回路3を用いることによって、映像機器から出力される通常の画像信号を装置内に取込んだが、既にシリアルあるいはパラレルにデジタル化された画像信号を装置内に取込んでもよい。この場合には、記憶部2に記憶されるべき画像信号は入力回路3およびA/D変換器41を介さず変換回路42に直接入力され

て読出され表示部9によって文字および記号として表示される。したがって、このポータブル画像提示装置は、従来の電子メモと同様に、所定のパターンの文字および記号も記憶でき、かつ、それを必要に応じて記憶部から取出し表示することができる。

また、記憶部2は、本体部1への脱着が可能なカートリッジ式であるので、予め種々の画像データ(文字・記号データも含む。)を記憶させた複数のカートリッジを用意し、この中から必要なデータが記憶されているカートリッジを選択的に本体部1に装着して用いれば、さらに多くの画像(文字および記号データを含む。)データを自由に取出し利用することが可能となる。

なお、実際には、文字・記号データと、TV、VTR、ビデオカメラ等の映像機器による再生画像やコンピュータによるグラフィックス画像のどちらを入力するか(あるいは取出して表示させるか)は、ユーザが本体部1に備え付けのキー入力スイッチ(図示せず)から所定のキー入力を行な

うことによって自由に選択できる。もちろん、このキー入力スイッチは、文字・記号入力スイッチ10と併用されてもよい。この場合には、このようなキー入力にตอบสนองして、文字・記号データの入力および記憶部からの読出、TV、VTR、ビデオカメラ等による再生画像やコンピュータによるグラフィックス画像の入力および記憶部からの読出に係る回路系を動作させるための制御信号を発生する制御部が必要となる。ただし、図面においては、このような制御系は図示されていない。さらに、実際には本体部1には、入力回路3と外部の映像機器等をユーザが接続するための接続用端子（図示せず）が設けられる。

〔発明の効果〕

以上のように、本発明にかかるポータブル画像提示装置によれば、従来の電子メモなどでは不可能であった複雑な画像の記録および再生が可能となる。さらに、記憶部が本体に脱着可能であるため、複数の記憶部を用意することによって結果的に記録できる情報量が増加する。したがって、本

発明にかかるポータブル画像提示装置を電子メモとして用いれば、電子メモの多機能化に極めて有効である。

4. 図面の簡単な説明

図は、本発明の一実施例を示す、ポータブル画像提示装置の概略ブロック図である。

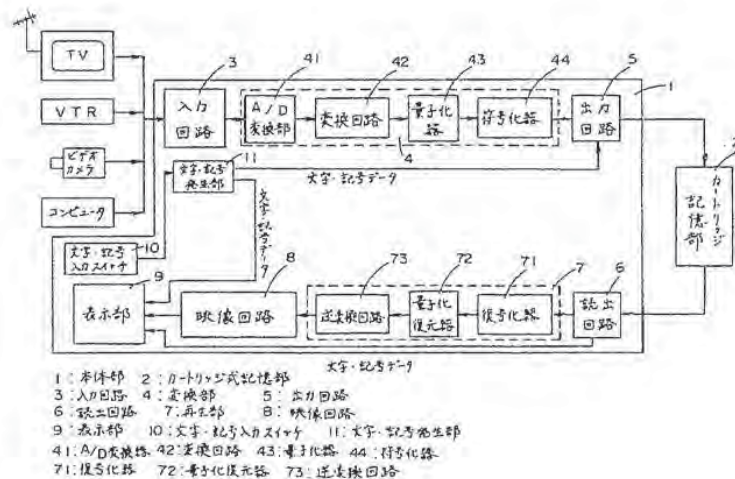
図において、1は本体部、2はカートリッジ式記憶部、3は入力回路、4は変換部、5は出力回路、6は読出回路、7は再生部、8は映像回路、9は表示部、10は文字・記号入力スイッチ、11は文字・記号発生部、41はA/D変換器、42は変換回路、43は量子化器、44は符号化器、71は復号化器、72は量子化復元器、73は逆変換回路である。

なお、図中、同一符号は同一または相当部分を示す。

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⑨ 日本国特許庁(JP)

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⑭ 発明の名称 ビデオレコーダ

⑮ 特 願 平1-166681

⑯ 出 願 平1(1989)6月30日

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最終頁に続く

明 細 書

1. 発明の名称

ビデオレコーダ

2. 特許請求の範囲

1. 画像信号と音声信号を同時に連続的に記憶、再生するビデオレコーダにおいて、画像信号と音声信号の記憶媒体に静止記憶媒体のみを用いたことを特徴とするビデオレコーダ。

2. 特許請求の範囲第1項記載のものにおいて、静止記憶媒体に半導体メモリを用いたことを特徴とするビデオレコーダ。

3. 特許請求の範囲第2項記載のものにおいて、半導体メモリに記憶させるデータをデジタル信号としたことを特徴とするビデオレコーダ。

4. 特許請求の範囲第1項記載のものにおいて、画像信号のサンプリング時間よりも音声信号のサンプリング時間を同じか又は、遅くしたことを特徴とするビデオレコーダ。

5. 特許請求の範囲第4項記載の音声信号のサンプリング時間は、画像信号のサンプリング時間

の整数倍としたことを特徴とするビデオレコーダ。

6. 特許請求の範囲第5項記載の音声信号の出力タイミングを画像信号の出力タイミングに同期させたことを特徴とするビデオレコーダ。

3. 発明の詳細な説明

〔産業上の利用分野〕

本発明はビデオレコーダに係り、特に画質、音質に好適な記憶装置を用いたビデオレコーダに関する。

〔従来の技術〕

従来のビデオレコーダはテープ又はディスク板等に画像信号と音声信号を記憶させていたためにこれらのテープ又はディスク板を駆動するためのアクリューターや信号を検出するためのヘッドが必要であつた。又、補助的に半導体メモリを用いて画像信号を一時的に静止画像として表示した例はあるが、音声信号と画像信号を連続的にメモリーから取り出し再生した例はない。又、録画した例もない。

〔発明が解決しようとする課題〕

従来のビデオレコーダや、レーザディスク装置等の音声信号と画像信号を取扱うものにおいて、記憶媒体に磁気テープ又は、光、磁気ディスク等のものを使用していたため、これらのテープ又はディスク板を駆動するためのキャプスタンモータやスピンドルモータ等のアクチュエータと録音、録画、再生を行うために記録した信号を取出すための検出ヘッド等を用いていた。

又、静止画像専用で半導体メモリに1画面分の画像信号を記憶させ表示した例はある。

上述のように従来は、半導体メモリに1画面分の画像信号のみのデータしか記憶させないために遅延した画像、音声を得ることについて配慮がなされていなかった。又、記憶媒体を回転させたりするために駆動源が必要であり省エネルギー、省スペース等の配慮がされておらず、回転ムラに起因する画質音質の歪等の問題があった。

本発明の目的は、省エネルギーで省スペース又、高音画質のビデオレコーダを提供することにある。

〔作用〕

従来用いていた回転移動記憶媒体を静止記憶媒体にする事により、回転移動に係わるキャプスタンモータ、スピンドルモータ等のアクチュエータが不要になるほか、記憶媒体から直接電氣的に信号を取り出すため、磁気ヘッド、光ヘッド等のメカ要素を省略できるので、省スペース、省エネルギーとなる。それによつて、従来キャプスタンモータの回転ムラやメカニカルは外乱（振動）が音質や画質に影響を与えていたが、メカ要素がなくなるためにピクチャーサーチがノズルレスが見れるほか、可変速サーチ及び可変速再生、録画が可能となる。更に、画面分割の特殊再生時に、画面毎に再生速度を変えたりする事が容易に行なえることで編集能力が向上する。又、他機、例えばパソコン、ビデオプリンタ、電話回線等あらゆるものとのインタフェースが可能となる。

その他多くの機能アップが考えられる。それらを列記すると、

(1) 同一画面に録画した内容の時間的に離れた部

〔課題を解決するための手段〕

上記目的を解決するために、従来記憶媒体に用いていた磁気テープ、光、磁気ディスク等の回転移動記憶装置を、半導体メモリ等の静止記憶媒体を用いることにより達成される。

尚、従来の磁気テープ（例えば2時間用）を半導体メモリに置き換えるときに必要なメモリ容量は、一画像の縦分割画素数を480、横方向を512画素、録画はカラー信号（1色8bitとする）とし、垂直同期信号の周波数を30Hzとしたときに637Gbitの画像メモリが必要となる。又、音声信号のメモリ数は、音声サンプリング信号の周波数を、画像サンプリング信号の1/128として計算すれば（ただし、データ構成を1Gbit）、6.6Gbitとなり、トータルで必要なメモリ数は、644Gbitとなる。しかし、データ圧縮の手法を用いることで、この数は、約1/100～1/1000とすることができると、実際に必要なメモリ容量は、0.64～6.4Gbitとなり1枚のメモリパックで容易に実現できるものである。

分の同時再生。

- (2) メモリ節約機能としてのパツキング、コンデンス機能。
- (3) インデックス表示。
- (4) マルチチャンネル（画面分割）。
- (5) デジタル録画、録音となるためデータ圧縮が可能となり必要メモリの低減。
- (6) イラスト等の編集が容易になり画面でのズーム機能。
- (7) ディスプレーに液晶やプラズマを用いることで、ビデオの上部に組込んでラツプトップタイプとする事ができる。
- (8) 耳のきこえない人のために字幕表示機能。
- (9) ビデオ通信機能。
- (10) 翻訳機能。
- (11) コマーシャル自動カット機能。
- (12) 1台で複数のコピー（ダビング）及び複数再生の機能。
- (13) 辞書、電話帳等のメモリ機能。
- (14) シークレット機能。

等である。

〔実施例〕

以下、本発明の一実施例を第 1 図～第 7 図により説明する。

第 1 図は本発明のビデオレコーダの構成図を示すもので、発振器 1 とコントローラ 2 と分周器 4 とメモリバンク 3 から成る。

発振器 1 は画像サンプリング信号 a を出力するもので、この画像サンプリング信号 a の周波数は例えば、画素数 245760 (512 × 480) で垂直同期信号が 30 Hz の場合、7.3728 MHz である。又、音声サンプリング信号 d は、前述の画像サンプリング信号を数分の一に分周したものであり、人間の可聴周波数との関係から 40 kHz 以上が望ましいことから 7.3728 MHz を 128 分の一として、57.6 kHz 程度にしたものである。これらの画像サンプリング信号 a と音声サンプリング信号 d は、メモリバンク 3 のアドレスをインクリメントする信号として使用し、1 画面の基準信号である垂直同期信号によりコントロールされる。

せた音声及び画像信号を検出するシリンダモータ、又、テープを巻きとるリールモータ等のアクチュエータを省略できる事から省エネルギーで小型化が可能となる効果がある。

第 4 図～第 6 図にメモリバンク 3 の構成を示す。

第 4 図は、メモリバンク 3 の本体の一辺に端子 32 とその端子 32 を機械的に保護するためのカバー 31 を示す。又、第 5 図は、第 4 図で示したメモリバンク 3 の本体に複数個(この場合は 2 個)の端子 32 とカバー 31 を取り付けたものを示す。

第 6 図は、メモリバンク 3 をもつと薄型化した場合に、端子 32 とカバー 31 を上面に設けた構成である。このように第 4 図から第 6 図に示したように薄型化することで多くのメモリバンク 3 を保存する場合に収納がし易い効果がある。このメモリバンク内のメモリは小型化するためにメモリのウエハチップが多層に重ねて作成してある。尚、チップ間の配線は上下をつなぐ場合にスルーホールやボンディングにより形成される。又、チップを多重にかさねるのができない場合には薄くモ-

このコントロール信号となる垂直同期信号 b は、マイクロコンピュータ等の演算機能をもつコントローラ 2 で作成する。尚、この垂直同期信号は、1 画面を構成する画素数(この例では 245760)毎に出力する。又、ダイレクトにアドレスを選択するコントロール信号 g もこのコントローラから出力できる。

以上の事を第 2 図に示す。

次にメモリバンク 3 について説明する。前述したように、画像信号と音声信号はそれぞれ第 3 図に示すように順に記憶させておき、画像サンプリング信号 a と音声サンプリング信号 d によりそれぞれ順に各アドレスを選択し出力する。この画像信号 e と音声信号 f は図示しないが、テレビやモニタの入力信号に適するように変調することでビデオ出力信号となる。尚、ビデオとしては録画する場合には前述の逆とすれば良い事はいうまでもない。

以上述べたように本実施例によれば、テープを駆動するキャブスタンモータと、テープに記憶さ

ルしたメモリチップを積層しても同様な効果が得られる。

第 7 図にビデオレコーダ本体 10 を示す。構成は、操作部 11 とメモリバンク 3 を入れる複数個のローディング口 12 がある。又、ローディング口 12 を複数とし、本体に複数個のメモリバンクを内蔵できることでダビングや、連続した長時間の録再生が可能となる効果がある。この場合の長時間録再生及びダビング等の切替えは言うまでもないが操作部 11 のスイッチで行う。

又、前述したメモリバンク 3 に取付けたカバー 31 は、本体 10 にローディングされるときに自動的にスライド及び開閉動作により端子部が出る仕組みになっている。又、図示しなかつたがメモリバンク内のメモリを一括消去できる機構も内蔵している。

〔発明の効果〕

本発明によれば、従来使用しているビデオテープレコーダに比べてモータ等のアクチュエータを用いないため、従来モータの回転ムラにより影響

特開平 3-34685 (4)

を受けていた画質を向上させることができると共に、画像サンプリング信号を可変速する事で可変速サーチや可変速再生、録画が可能となる効果がある。又、増勢部がない事から無騒音で長寿命となり信頼性向上の効果と共に耐環境性の向上効果がある。

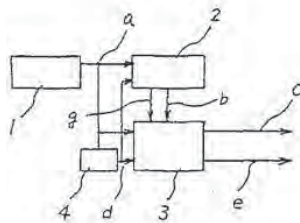
又、音声信号と画像信号をすべてデジタルで扱うことで画像、音声信号の通信機能の高速化がはかれる効果がある。又、メモリの消去においては、EEPROMを用いれば電氣的に消去できるため高速消去が可能となる効果がある。

4. 図面の簡単な説明

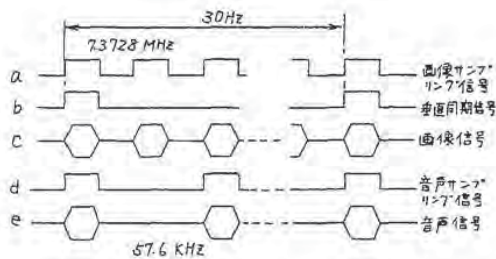
第1図は本発明の一実施例の構成図、第2図は第1図のタイミングチャート、第3図はメモリバツクの構成図、第4図、第5図、第6図はメモリバツクの外觀図、第7図はビデオレコーダの外觀図を示す。

1…発振器、2…コントローラ、3…メモリバツク、4…分周器、a…画像サンプリング信号、b…垂直同期信号、c…画像信号、d…音声サンプリング信号、e…音声信号

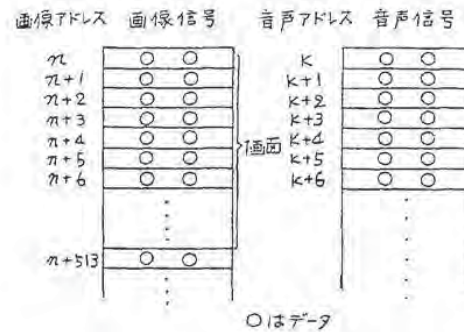
第1図



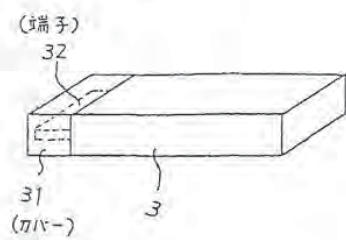
第2図



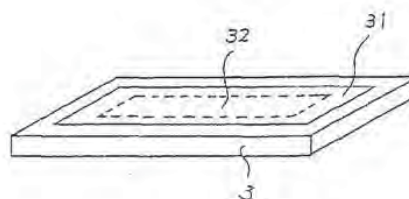
第3図



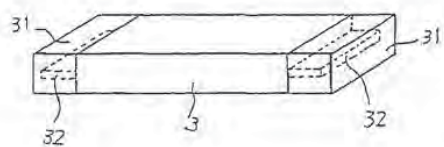
第 4 図



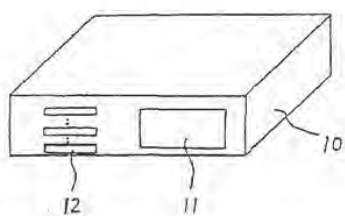
第 6 図



第 5 図



第 7 図



第 1 頁の続き

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Application Number:	90009329
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Title of Invention:	MULTIMEDIA TIME WARPING SYSTEM
First Named Inventor/Applicant Name:	6233389
Customer Number:	26111
Filer:	Lori Ann Gordon/sonia neves
Filer Authorized By:	Lori Ann Gordon
Attorney Docket Number:	2513.002REX0
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Time Stamp:	17:33:49
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2513002rex0.pdf	649187 f09d1d5d34288f6508e062c4572cbe6fa973880	yes	7

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Reexam Miscellaneous Incoming Letter		1	1	
	Transmittal Letter		2	4	
	Information Disclosure Statement (IDS) Filed (SB/08)		5	7	
Warnings:					
Information:					
2	Foreign Reference	FP20_ep784400.pdf	723162 ead101282a84c660f53291b3408519451e g56f	no	24
Warnings:					
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3	Foreign Reference	FP21_jp61_133089.pdf	133471 55644a41e392e305315bb75a1bf800f735a a645d	no	3
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4	Foreign Reference	FP22_jp2_266774.pdf	194389 97aff251b65da3d11791a67e19ed542d402a 2c908	no	4
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5	Foreign Reference	FP23_jp3_34685.pdf	191471 1011bd3a747e23f1645b33e3ff6d5036d2ed e955	no	6
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6	NPL Documents	sitricksdreamworks.pdf	686062 6e0877b0afca9077d4658558c2b0d66d47bd 28d49	no	9
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7	NPL Documents	NPL58_jp61_133089_abstract. pdf	62529 b0c2373926b7a25a78d6a72830077ef38d0 e8ab5	no	2
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Warnings:					

Information:					
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Total Files Size (in bytes):			2766385		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reexam of U.S. Patent No.: 6,233,389

BARTON *et al.*

Reexam Control No.: 90/009,329

Filed: November 10, 2008

For: **Multimedia Time Warping System**

Confirmation No.: 2859

Art Unit: 3992

Examiner: Fred O. Ferris, III

Atty. Docket: 2513.002REX0

Information Disclosure Statement

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Attn: Central Reexamination Unit
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Listed on accompanying IDS Forms are documents that may be considered material to the patentability of this reexamination as defined in 37 C.F.R. §§ 1.56 and 1.555. Copies of documents FP20-FP23 and NPL57-NPL61 are submitted. However, in accordance with 37 C.F.R. § 1.98(a)(2), no copies of the U.S. patents cited on the attached IDS Forms are submitted.

In accordance with 37 C.F.R. § 1.97, the filing of this IDS should not be construed to be an admission that the information cited in the statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b). Further, the Patent Owner has listed publication dates on the attached IDS Form based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the date indicated.

A concise explanation of the relevance of the non-English language documents appears below in accordance with 37 C.F.R. § 1.98(a)(3):

- Document FP21 (JP 61-133089 A) appears to describe a portable VTR containing device. An English language abstract of document FP21 is enclosed as document NPL58.
- Document FP22 (JP 2-266774 A) appears to describe a portable picture presenting device. An English language abstract of document FP22 is enclosed as document NPL59.
- Document FP23 (JP 3-34685 A) appears to describe a video recorder. An English language abstract of document FP23 is enclosed as document NPL60.

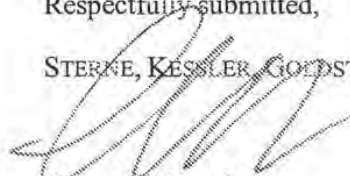
Patent Owner reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered. This IDS submission should not be construed as a representation that a search has been made, or that information more material to the examination of the present reexamination does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

It is respectfully requested that the Examiner initial and return a copy of the enclosed IDS Form, and indicate in the official file wrapper of this reexamination that the documents have been considered.

It is not believed that any fees are required with submission of this IDS. (See MPEP § 2202.) However, if necessary, the U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Edward J. Kessler
Attorney for Patent Owner
Registration No. 25,633

Date: 20 May 2010

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Electronic Acknowledgement Receipt	
EFS ID:	7656599
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International Application Number:	
Confirmation Number:	2859
Title of Invention:	MULTIMEDIA TIME WARPING SYSTEM
First Named Inventor/Applicant Name:	6233389
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Filer Authorized By:	
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Reexam Certificate of Service	COS.pdf	38598 80db394620a1758a1280a826ffa057ce1cfe5914	no	1

Warnings:

Information:

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>				Application Number	90/009,329
				Filing Date	November 10, 2008
				First Named Inventor	James M. BARTON
				Art Unit	3992
				Examiner Name	Ferris III, Fred O.
Sheet	1	of	1	Attorney Docket Number	2513.002REX0

U.S. PATENT DOCUMENTS					
Examiner Initials ²	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ³ (if known)			
	US77	2,865,990	12-23-1958	Towler	
	US78	4,566,034	01-21-1986	Harger <i>et al.</i>	
	US79	5,497,244	03-05-1996	Chargin, Jr. <i>et al.</i>	
	US80	5,510,858	04-23-1996	Shido <i>et al.</i>	
	US81	5,557,724	09-17-1996	Sampat <i>et al.</i>	
	US82	5,574,662	11-12-1996	Windrem <i>et al.</i>	
	US83	5,721,817	02-24-1998	Kurihara <i>et al.</i>	
	US84	5,805,804	09-08-1998	Laursen <i>et al.</i>	
	US85	5,864,582	01-26-1999	Ander <i>et al.</i>	
	US86	5,898,695	04-27-1999	Fujii <i>et al.</i>	
	US87	5,940,074	08-17-1999	Britt, Jr. <i>et al.</i>	
	US88	5,990,881	11-23-1999	Inoue <i>et al.</i>	
	US89	6,163,646	12-19-2000	Tanaka <i>et al.</i>	
	US90	6,172,712 B1	01-09-2001	Beard	
	US91	6,181,706 B1	01-30-2001	Anderson <i>et al.</i>	
	US92	6,209,041 B1	03-27-2001	Shaw <i>et al.</i>	
	US93	6,317,885 B1	11-13-2001	Fries	
	US94	6,359,636 B1	03-19-2002	Schindler <i>et al.</i>	
	US95	6,490,000 B1	12-03-2002	Schaefer <i>et al.</i>	
	US				

FOREIGN PATENT DOCUMENTS					
Examiner Initials ²	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code ³ Number ³ Kind Code ³ (if known)			
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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>		Complete if Known			
		Application Number	90/009,329		
		Filing Date	November 10, 2008		
		First Named Inventor	James M. BARTON		
		Art Unit	3992		
		Examiner Name	Ferris III, Fred O.		
Sheet	1	of	4	Attorney Docket Number	2513.002REX0

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	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 ²
	NPL62	U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, AT&T's and Microsoft Corporation's Invalidity Contentions, TiVo Inc. vs. AT&T Inc. and Microsoft Corporation, Case No. 2:09-CV-259-DF, 44 pages, May 21, 2010.	
	NPL63	Exhibit A14 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,018,612, and in further view of U.S. Patent No. 5,477,263 and U.S. Patent No. 6,169,843, 11 pages.	
	NPL64	Exhibit A1 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,557,724 to Sampat, 23 pages.	
	NPL65	Exhibit A12 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,721,815 to Ottesen et al., 18 pages.	
	NPL66	Exhibit A8 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,822,493, 161 pages.	
	NPL67	Exhibit A13 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,018,612 to Thomason, et al. and further in view of U.S. Patent No. 5,949,948 to Krause et al., 7 pages.	
	NPL68	Exhibit A20 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,990,881, 6 pages.	
	NPL69	Exhibit A2 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,169,843, 6 pages.	
	NPL70	Exhibit A6 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,172,712, 137 pages.	
	NPL71	Exhibit A3 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,181,706, 5 pages.	

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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>		Application Number	90/009,329
		Filing Date	November 10, 2008
		First Named Inventor	James M. BARTON
		Art Unit	3992
		Examiner Name	Ferris III, Fred O.
		Attorney Docket Number	2513.002REX0
Sheet	2	of	4
NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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 ²
	NPL72	Exhibit A5 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,209,041, 140 pages.	
	NPL73	Exhibit A19 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,304,714 to Krause et al., 7 pages.	
	NPL74	Exhibit A23 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of DISHPlayer 7100 System and U.S. Patent No. 6,490,000, 21 pages.	
	NPL75	Exhibit A9 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,490,000, 134 pages.	
	NPL76	Exhibit A4 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 7,272,298 to Richard Lang, 11 pages.	
	NPL77	Exhibit A7 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of Graham Thomason, EP0594241, 136 pages.	
	NPL78	Exhibit A22 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of Developing Object-Oriented Multimedia Software by Phillip Ackermann, 9 pages.	
	NPL79	Exhibit A10 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of C. Hanna et al., Demultiplexer IC For MPEG2 Transport Streams, 138 pages.	
	NPL80	Exhibit A11 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of Robert Johnston, A Digital Television Sequence Store, 148 pages.	
	NPL81	Exhibit A16 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of "A Programming System for the Dynamic Manipulation of Temporally Sensitive Data" by Christopher J. Lindblad, 16 pages.	

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				Application Number	90/009,329
				Filing Date	November 10, 2008
				First Named Inventor	James M. BARTON
				Art Unit	3992
				Examiner Name	Ferris III, Fred O.
Sheet	3	of	4	Attorney Docket Number	2513.002REX0
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials*	Cite No. ¹	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 ²
	NPL82	Exhibit A15 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of "StreamObjects: Dynamically-Segmented Scalable Media Over the Internet" by Steven Niemczyk, 17 pages.			
	NPL83	Exhibit A17 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of "An Architecture for Networked Multimedia" by Jonathan C. Soo, 12 pages.			
	NPL84	Exhibit A18 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of "Design of a Storage and Retrieval Model for Multimedia Data" by Ruihong Wang, 11 pages.			
	NPL85	Exhibit A21 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,898,695, 6 pages.			
	NPL86	Ash, Robert, <i>Real-Time Encoding and Feeds in Oracle Video Server</i> , Oracle Corporation, entire document (March 1998).			
	NPL87	Cline, Linda S. et al., "DirectShow™ RTP Support for Adaptivity in Networked Multimedia Applications," <i>Proc. of the IEEE International Conference on Multimedia Computing and Systems</i> , 10 pages (1998).			
	NPL88	Hanna, C. et al., "Demultiplexer IC for MPEG2 Transport Streams," <i>IEEE Transactions on Consumer Electronics</i> , Vol. 41, No. 3, pp. 699-706 (August 1995).			
	NPL89	Kurioka, Tatsuya et al., "Television Home Server for Integrated Services - Toward the Realization of ISDB 'Anytime' Services," <i>Proceedings ISCE '97, IEEE International Symposium on Consumer Electronics</i> , pp. 250-253 (Dec. 2, 1997).			
	NPL90	Lindblad, Christopher, <i>A Programming System for the Dynamic Manipulation of Temporally Sensitive Data</i> , MIT Laboratory for Computer Science, 275 pages (August 1994).			
	NPL91	Linden, Brian and Prather, Matt, <i>Oracle Video Server: Introducing the Oracle Video Server</i> , Release 3.0, entire document (1998).			

Examiner Signature	Date Considered
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				<i>Application Number</i>	90/009,329
				<i>Filing Date</i>	November 10, 2008
				<i>First Named Inventor</i>	James M. BARTON
				<i>Art Unit</i>	3992
				<i>Examiner Name</i>	Ferris III, Fred O.
				<i>Attorney Docket Number</i>	2513.002REX0
Sheet	4	of	4		
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials*	Cite No. ¹	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			
	NPL92	Niemczyk, Steven, <i>Stream Objects: Dynamically Segmented Scalable Media Over the Internet</i> , Thesis, Massachusetts Institute of Technology, 90 pages (May 27, 1996).			
	NPL93	Oracle Corporation, <i>Video-Enhanced Web Services</i> , An Oracle, DIGITAL, Ericsson and Acorn White Paper, entire document (March 1998).			
	NPL94	Soo, Jonathan, <i>An Architecture for Networked Multimedia</i> , Thesis, Massachusetts Institute of Technology, 49 pages (May 1995).			
	NPL95	Tektronix PDR 100 Profile™ Video Disk Recorder, <i>User Manual</i> , entire document (First Printing: February 1995, Revised: August 1995).			
	NPL96	Wang, Ruihong, <i>Design of a Storage and Retrieval Model for Multimedia Data</i> , Thesis, University of Ottawa, 116 pages (1994).			
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Examiner Signature		Date Considered	
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Electronic Acknowledgement Receipt	
EFS ID:	7734236
Application Number:	90009329
International Application Number:	
Confirmation Number:	2859
Title of Invention:	MULTIMEDIA TIME WARPING SYSTEM
First Named Inventor/Applicant Name:	6233389
Customer Number:	26111
Filer:	Lori Ann Gordon/Kim Perry
Filer Authorized By:	Lori Ann Gordon
Attorney Docket Number:	2513.002REX0
Receipt Date:	02-JUN-2010
Filing Date:	10-NOV-2008
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Application Type:	Reexam (Patent Owner)

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21	NPL Documents	NPL84_Exhibit_A18.pdf	744954 54239842054f064b687f818012c072ba0c7457	no	11
Warnings:					
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22	NPL Documents	NPL85_Exhibit_A21.pdf	425681 b413d0bc5501054287bc8c08a3e81490fe96c5d	no	6
Warnings:					
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23	NPL Documents	NPL86_Ash.pdf	483222 39453fe35b662aac3698108790ba46628e57b2ea	no	7
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24	NPL Documents	NPL87_Cline.pdf	322368 e99fb8283becd98e2a162b635cebfcb9cb1a823	no	10
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25	NPL Documents	NPL95_Tektronix.pdf	15578801 c585e5c5ca9556a8ab2adab0b3b0d0c828c15ac9	no	156
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26	NPL Documents	NPL96_Wang.pdf	2776763 0edf6b8e949933e0b67f1bcb59ebfded000ce92c	no	116
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27	NPL Documents	NPL66_Exhibit_A8.pdf	22505326 e4ad23e94f36132f6843668987a2d4bc98c8e70d	no	161
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28	NPL Documents	NPL75_Exhibit_A9.pdf	20734289	no	134
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30	NPL Documents	NPL88_Hanna.pdf	450709	no	8
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Warnings:					
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31	NPL Documents	NPL89_Kurioka.pdf	530415	no	4
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32	NPL Documents	NPL90_Lindblad.pdf	18329734	no	275
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33	NPL Documents	NPL91_Linden.pdf	14148147	no	78
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Warnings:					
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Warnings:					
Information:					
35	NPL Documents	NPL94_Soo.pdf	4516575	no	49
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Warnings:					
Information:					
36	NPL Documents	NPL92_Niemczyk.pdf	10652344	no	90
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June 2, 2010

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Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Re: Reexamination of U.S. Patent No. 6,233,389
Reexam Control No. 90/009,329; Filed: November 10, 2008
For: **Multimedia Time Warping System**
Inventors: BARTON *et al.*
Our Ref: 2513.002REXO

Sir:

Transmitted herewith for appropriate action are the following documents:

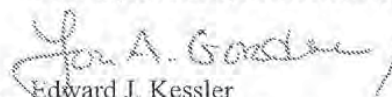
1. Information Disclosure Statement;
2. Certification of Service of Information Disclosure Statement;
3. One (1) sheet of Form PTO/SB/08a listing nineteen (19) documents;
4. Four (4) sheets of Form PTO/SB/08b listing thirty-five (35) documents; and
5. Copies of the documents listed as NPL62-NPL96.

The above-listed documents are being filed electronically through EFS-Web.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

for  /50,633
Edward J. Kessler
Attorney for Patent Owner
Registration No. 25,688

EJK/LAG:jeg
Enclosures
11/2/10 1:00C

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reexam of U.S. Patent No.: 6,233,389
BARTON *et al.*
Reexam Control No.: 90/009,329
Filed: November 10, 2008
For: Multimedia Time Warping System

Confirmation No.: 2859
Art Unit: 3992
Examiner: Fred O. Ferris, III
Atty. Docket: 2513.002REX0

Information Disclosure Statement

Mail Stop Ex Parte Reexam

Attn: Central Reexamination Unit
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Listed on accompanying IDS Forms are documents that may be considered material to the patentability of this reexamination as defined in 37 C.F.R. §§ 1.56 and 1.555. Copies of documents NPL62-NPL96 are submitted. However, in accordance with 37 C.F.R. § 1.98(a)(2), no copies of the U.S. patents cited on the attached IDS Forms are submitted.

The following documents were identified in AT&T's and Microsoft Corporation's Invalidity Contentions pleading in a civil action in the Eastern District of Texas (*TiVo Inc. vs. AT&T Inc. and Microsoft Corporation*, 2:09-CV-259-DF) relating to Patent No. 6,233,389. However, copies of these documents were not provided to Tivo by AT&T and Microsoft:

- 1) Philipp Ackermann, "Developing Object-Oriented Multimedia Software" (1996).
- 2) Loronix CCTVware Enterprise Brochure.
- 3) Loronix CCTVware Solo Brochure.

In accordance with 37 C.F.R. § 1.97, the filing of this IDS should not be construed to be an admission that the information cited in the statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b). Further, the Patent Owner has listed publication dates on the attached IDS Form based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the date indicated.

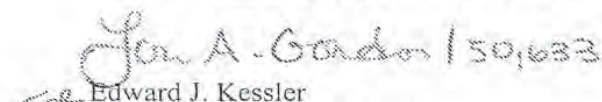
Patent Owner reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered. This IDS submission should not be construed as a representation that a search has been made, or that information more material to the examination of the present reexamination does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

It is respectfully requested that the Examiner initial and return a copy of the enclosed IDS Form, and indicate in the official file wrapper of this reexamination that the documents have been considered.

It is not believed that any fees are required with submission of this IDS. (See MPEP § 2202.) However, if necessary, the U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.


Edward J. Kessler
Attorney for Patent Owner
Registration No. 25,633

Date: June 2, 2010

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/009,329	11/10/2008	6233389	2513.002REX0	2859
26111	7590	06/04/2010	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C. 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			ART UNIT	PAPER NUMBER

DATE MAILED: 06/04/2010

Please find below and/or attached an Office communication concerning this application or proceeding.



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Los Angeles, California 90013

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. 90/009,329.

PATENT NO. 6233389.

ART UNIT 3992.

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)).

Office Action in Ex Parte Reexamination	Control No. 90/009,329	Patent Under Reexamination 6233389	
	Examiner Fred Ferris	Art Unit 3992	

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

- a ☒ Responsive to the communication(s) filed on 4/8/2010. b ☒ This action is made FINAL.
c ☐ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 2 month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- | | |
|---|---|
| 1. ☐ Notice of References Cited by Examiner, PTO-892. | 3. ☐ Interview Summary, PTO-474. |
| 2. ☒ Information Disclosure Statement, PTO/SB/08. | 4. ☐ _____ |

Part II SUMMARY OF ACTION

- 1a. ☒ Claims 31 and 61 are subject to reexamination.
1b. ☐ Claims are not subject to reexamination.
2. ☐ Claims have been canceled in the present reexamination proceeding.
3. ☐ Claims are patentable and/or confirmed.
4. ☒ Claims 31 and 61 are rejected.
5. ☐ Claims are objected to.
6. ☐ The drawings, filed on are acceptable.
7. ☐ The proposed drawing correction, filed on has been (7a) ☐ approved (7b) ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have
1 ☐ been received.
2 ☐ not been received.
3 ☐ been filed in Application No. _____
4 ☐ been filed in reexamination Control No. _____
5 ☐ been received by the International Bureau in PCT application No. _____
* See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____

cc: Requester (if third party requester)

DETAILED ACTION

Introduction

This Office Action is responsive to Patent owner's response filed November 2, 2009 and Supplemental Reply of April 8, 2010 in the *ex parte* reexamination of United States Patent Number 6,233,389 issued to Barton et al. Claims 31 and 61 remain rejected. This action is FINAL.

Patent owner's Supplemental Reply of April 8, 2010 proposing additional claims has NOT been entered. The amendment does not meet the criteria required by 37 CFR 1.111(2) which recites the following:

"(2) *Supplemental replies*. (i) A reply that is supplemental to a reply that is in compliance with § 1.111(b) will not be entered as a matter of right except as provided in paragraph (a)(2)(ii) of this section. The Office may enter a supplemental reply if the supplemental reply is clearly limited to:

- (A) Cancellation of a claim(s);
 - (B) Adoption of the examiner suggestion(s);
 - (C) Placement of the application in condition for allowance;
 - (D) Reply to an Office requirement made after the first reply was filed;
 - (E) Correction of informalities (e.g., typographical errors); or
 - (F) Simplification of issues for appeal.
- (ii) A supplemental reply will be entered if the supplemental reply is filed within the period during which action by the Office is suspended under § 1.103(a) or (c)."

Response to Arguments

Patent owner's arguments generally mirror the Villasenor declaration and hinge on the meaning of the terms "source object", "sink object", and "automatic[ally] flow control[led]". Patent owner's arguments, and the Villasenor Declaration, have been fully considered as explained in the examiner's response to appearing below.

A. "Source Object"

Patent owner first argues that the claimed *"source object"* *does much more than simply place data from a source into a buffer* as indicated by the examiner in the office action. Here, Patent owner proposes that the examiner's construction citing 8:43-45 of the '389 Patent describes only one action taken by the source object. (i.e. "[t]he source object 901 takes data out of a physical data source, such as the Media Switch, and places it into a PES buffer.") Patent owner proposes that actions taken by the source object act on the system in "other ways" as well and cites the Villasenor declaration (26) for support. (See: Examiner's note below) However, Patent owner fails to explain how the specification expressly discloses any of the "other ways" that the source object acts on the system. Instead, Patent owner points to the language of the claims requiring action by the source object (e.g. "said source object converts video data into data streams and fills said buffer with data streams") but cites no supporting specification passages describing such actions.

For purposes of claim construction, the examiner gives the term "object" the widely accepted computer science meaning of a "collection of data and operations". Hence the term "source object", taken in light of the specification, can be interpreted to simply be the data, and the program code associated with any supporting hardware (e.g. memory (buffers), processors, and controllers) for performing the claimed functions. Therefore, the examiner maintains that even if the term "source object" is given the construction proposed by Patent owner, namely, that the source object somehow (1) extracts video and audio data from a physical data source, (2) obtains a buffer (memory) from a transform object, (3) converts video data into data streams, (4) fills the

buffer (memory) with the streams, and (5) is automatically flow controlled by a transform object, then the limitations are still disclosed in the prior art based on the broadest reasonable interpretation. In this instance the functions (i.e. "operations") themselves, e.g. the extraction of video and audio data from data source, conversion of video data into data streams... etc., are disclosed in the prior art of record as set forth in the 103 rejections appearing below. For example, (1) extracts video and audio data from a physical data source is disclosed by Thomason because the operation of DMA controller 31 and microprocessor 24 through software meets the recited source object step as the operation transfers video and audio data from the physical data source, i.e., buffer 4, to buffer memory 35. (Thomason at col. 3, lines 53-64.) Thus, Thomason meets the broadest reasonable interpretation of the "source object" extracting video and audio data from a physical source as claimed.

Examiner's Note: Patent owner cites the Villasenor declaration (26) in support of the "other ways" the source object acts on the system. However, the declaration also fails to explain how the '389 specification expressly discloses any of the "other ways" that the source object acts on the system. The Villasenor declaration also cites Figure 9 of '389 Patent as apparently exemplary of the claimed "source object" and "sink object". Figure 9, includes numerous elements (904-907) relating to the Tivo Media Kernal. (e.g. Tmk core, Tmk Pipeline, Tmk, source, etc.) However, none of these elements are expressly claimed, and the cited passages of the '389 specification does not make clear how any of these elements are associated with the claimed "source object". Accordingly, a skilled artisan would understand from the specification that the source object 901 takes data out of a physical source (e.g. a media switch) and places it into a buffer. (i.e. '389 at 8:43-54)

B. Thomason discloses the "Source Object" and "Automatically Flow Controlled" limitations based on the broadest reasonable interpretation.

Patent owner next argues that Thomason *does not meet the claim element "wherein said source object is automatically flow controlled by said transform object"*. Instead, Patent owner believes that the design of Thomason is aimed at a system in which there is no flow control and cites the Villasenor declaration (31, 32) for support. (See: Examiner's note below) The examiner disagrees with this narrow view of Thomason. Here Patent owner argues that Thomason does not disclose flow control between buffer (4) and buffer (35) with regard to DMA controller 31 because the operation is described in passive terms. However this view of Thomason ignores the fundamental principles of the operation of DMA controllers. A skilled artisan would understand that DMA controllers (e.g. 31, 32, & 33 of Thomason) require some type of handshaking between the buffer memories. (e.g. buffer (4) and buffer mem. (35) of Thomason) A skilled artisan would also know that, in a traditional synchronous DMA transfer, handshaking (e.g. via a "ready" line and program control) is the way the DMA controller "regulates" the data transfer between memories. (See: DMA (Embedded Systems) page 3, paragraphs 3-4, of record) Hence a skilled artisan would understand that the DMA controller can be thought of as "self regulating" during any traditional DMA data transfer operation. This understanding is completely consistent with Patent owner's proposed definition of the term "automatic flow control" as meaning "self regulating". ('389 at 8:49) The fact that Thomason discloses that main memory 36 is "available to receive data" from DMA controller 32 occurs "downstream" of buffers 4 and 35 is irrelevant

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since the same regulation of flow must occur between buffer (4) and buffer (35) with regard to DMA controller 31 which is not downstream.

Thomason also discloses that the microprocessor 24 runs software for the administration and allocation of the buffer memory. (Thomason at 3:60-63) This software, which allocates (obtains) buffer memory and administers (controls) data transfer between the buffers, is functionally an "object" in light of the explanation given above. Finally, Patent owner's reference to the object being "*blocked*" *until there is sufficient memory* ('389 at 8:45-49, Villasenor at 32) as being exemplary of "automatic flow control" does not distinguish over the prior art since Thomason discloses that DMA controllers regulate the data transfer between buffers as explained above. (The "blocked" feature is not even expressly required by the language of the claim.) Therefore Thomason discloses the necessary interaction between objects in controlling the flow of data between buffers.

Examiner's note: The Villasenor declaration (31) makes the same "downstream" argument with regard to the DMA controller already rebutted based on the reasoning set forth above. The Villasenor declaration (32) also opines that automatic flow control is a result of the source object's desire to obtain a buffer from the (downstream) transform object, the source object being "blocked", and the self-regulating pipeline. ('389 at 8:45-49) The examiner agrees that the '389 specification does appear to indicate that flow control is "automatic" because of the way the pipeline is constructed (e.g. '389 at 11:25). However, the "pipeline", "downstream" transform object, and "blocked" features relied upon in the declaration are not specifically required by the language of the claim.

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C. "Sink Object"

Patent owner offers essentially the same arguments with regard to the claimed "sink object" as offered for the "source object". Namely, that the claimed "sink object" does much more than simply consume data from a buffer as referenced at 7:50 of the '389 Patent, and stated by the examiner in the office action. Patent owner cites the Villasenor declaration (36) but again fails to explain how the specification expressly discloses the purported "much more" system operation aspects of the sink object. Patent owner again points to the language of the claims requiring action by the sink object (e.g. "obtains" and "outputs data streams") but cites no supporting specification passages describing such actions. As explained above, the examiner gives the term "object" the widely accepted computer science meaning of a "collection of data and operations". Hence the term "sink object" can be interpreted to simply be the data and program code associated with any supporting hardware (e.g. memory (buffers), processors, and controllers) for performing the claimed functions. Hence, the examiner again maintains that even if the term "sink object" is given the construction proposed by Patent owner, namely, that the sink object somehow (1) obtains data streams from a transform object, (2) outputs data streams to a video and audio decoder, and (3) is automatically flow controlled by a transform object, then the limitations are still disclosed in the prior art based on the broadest reasonable interpretation. In this instance the functions (i.e. "operations") themselves, e.g. obtaining data streams, outputting data streams to a video and audio decoder... etc., are disclosed in the prior art of record as set forth in the 103 rejections appearing below. For example, (2) outputs data streams to a video and audio decoder, is disclosed by Thomason because the operation of DMA controller 33 and the microprocessor 24 meets the sink object step as it operates to transfer data streams under

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program control from variable buffer memory 35 to buffer 14. Fig. 1 shows that buffer 14 outputs the data to decompressor 13 and d/a converter 12. (As noted below, in MPEG format the decompressor would by necessity include a video decoder and an audio decoder) Thus, Thomason meets the broadest reasonable interpretation of the "sink object" outputting data streams to a video and audio decoder as claimed.

Examiner's Note: Patent owner cites the Villasenor declaration (36) in support of the "other ways" the sink object acts on the system. However, the declaration also fails to explain how the '389 specification expressly discloses any of the "other ways" that the sink object acts on the system. The Villasenor declaration also cites Figure 9 of '389 Patent as apparently exemplary of the claimed "source object" and "sink object". Figure 9, includes numerous elements (904-907) relating to the Tivo Media Kernal. (e.g. Tmk core, Tmk Pipeline, Tmk, source, etc.) However, none of these elements are expressly claimed, and the cited passages of the '389 specification do not make clear how any of these elements are associated with the claimed "sink object".

Accordingly, a skilled artisan would simply understand from the specification that the sink object consumes data in the buffer. (i.e. '389 at 7:50)

D. Thomason discloses the "Sink Object" and "Automatically Flow Controlled" limitations based on the broadest reasonable interpretation.

Patent owner next argues that Thomason *does not meet the claim element "wherein said sink object is automatically flow controlled by said transform object"*. Instead, Patent owner believes that the design of Thomason is aimed at a system in which there is no flow control and cites the Villasenor declaration (38) for support. As previously explained, the examiner disagrees with

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this narrow view of Thomason. Here Patent owner argues that Thomason does not disclose flow control between the output data side of buffer (35) into buffer (14) with regard to DMA controller 33. However, as explained above, this view of Thomason ignores the fundamental principles of the operation of DMA controllers. A skilled artisan would understand that DMA controllers (e.g. 31, 32, & 33 of Thomason) require some type of handshaking between the buffer memories. (e.g. buffer (35) and buffer mem. (14) of Thomason) A skilled artisan would also know that, in a traditional synchronous DMA transfer, handshaking (e.g. via a "ready" line and program control) is the way the DMA controller "regulates" the data transfer between memories. (See: DMA (Embedded Systems) page 3, paragraphs 3-4, of record) Hence a skilled artisan would understand that the DMA controller can be thought of as "self regulating" during any traditional DMA data transfer operation. This understanding is completely consistent with Patent owner's proposed definition of the term "automatic flow control" as meaning "self regulating". ('389 at 8:49) The fact that Thomason discloses that main memory 36 is "available to receive data" from DMA controller 32 occurs "downstream" of buffers 4 and 35 is irrelevant since the same regulation of flow must occur between buffer (4) and buffer (35) with regard to DMA controller 31 which is not downstream.

Thomason also discloses that the microprocessor 24 runs software for the administration and allocation of the buffer memory. (Thomason at 3:60-63) This software, which allocates (obtains) buffer memory and administers (controls) data transfer between the buffers, is functionally an "object" in light of the explanation given above. Finally, Patent owner's reference to the object being able to "block" the sink until the buffer is ready ('389 at 8:52-65, Villasensor at 40), as being exemplary of "automatic flow control", does not distinguish over the prior art since

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Thomason discloses that DMA controllers “regulate” the data transfer between buffers as explained above. (The “block” feature is not even expressly required by the language of the claim.) Therefore Thomason discloses the necessary interaction between objects in controlling the flow of data between buffers.

Examiner’s note: The Villasenor declaration (38) makes the same “downstream” argument with regard to the DMA controller already rebutted based on the reasoning set forth above. The Villasenor declaration (39) also opines that automatic flow control is a result of the sink object’s desire to obtain a buffer from the (upstream) transform object, the sink object being “blocked”, and the self-regulating pipeline. (’389 at 8:45-49) The examiner agrees that the ’389 specification does appear to indicate that flow control is “automatic” because of the way the pipeline is constructed (e.g. ’389 at 11:25). However, the “pipeline”, “upstream” transform object, and “blocked” features relied upon in the declaration are not specifically required by the language of the claim.

E. The combination of Thomason and Krause renders claims 31 and 61 obvious.

Patent owner cites the Villasenor declaration (43-48) and argues that the combination of Thomason and Krause would significantly *change the principle of operation of Thomason because Thomason’s acceleration controller operates on combined analog audio and video signals and Krause’s I-frame detector works on digital signals*. The examiner does not agree for several reasons. First, creating digital video from analog video was within the ordinary capabilities of a skilled artisan and in common practice at the time of the invention. (See: Numerous prior art references (all of record) citing MPEG encoders converting digital video

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from standard (analog) video signal streams – EP 0 762 756 A2 Sasaki, Seishi page 5 lines 16, 54, page 6 line 42, Figs. 1, 5, 6, Nelson, Lee J. “The Latest in Compression Hardware and Software page 7, Leek, M. R. “MPEG Q&A” page 2, for example) Thus, converting Thomason's analog video stream to an encoded MPEG digital video stream would have been a trivial task for a skilled artisan.

Second, Krause teaches an embodiment for retrieving I-frames for fast forward and reverse playback functions using an I-frame table which is created in advance. (Krause at 11:37-55, Figs. 4&5) At 11:35 Krause recites the following:

A more efficient retrieval method can be used if the locations of the I-frames on the Storage Device 140 are known in advance. FIG. 4 shows this second embodiment for retrieving I-frames for fast forward and reverse playback. The sequence number I of the next I-frame to be retrieved is determined as in the first embodiment, based on the direction and rate of playback in step 400. The address or index number of the block on the storage device containing the beginning of this I-frame is then determined by referencing a table which is created in advance (not shown in FIG. 4) and used to initialize storage block counter k in step 410. This storage block is then retrieved, in step 420, and the beginning of the I-frame is located by scanning the storage block for the unique sequence of bits used to identify the I-frames and comparing the sequence number with the chosen value I, in step 430. SELECT is then set to 1, in step 440, so that subsequent data will be delivered to the Decoder 150. As shown in steps 450-456 (like steps 390-396 of FIG. 3) the Controller 130 will then continue to retrieve subsequent blocks from the storage device until the end of the I-frame is detected, at which time SELECT will be reset to 0. (emphasis added)

(Also see: Krause at 11:55-12:14, Figs. 4&5)

Hence, Krause teaches a mechanism to store the identified I-frame location information and provide it to the controller to accommodate fast forward and reverse playback functions.

Thus, while the Villasenor declaration opines that the Thomason acceleration controller would be unable to act on digital signals because the system receives only uncompressed analog video, the prior art appears to overwhelmingly support the position that a skilled artisan would have known how to convert analog video to MPEG video, and perform any required modifications to

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the microprocessor, DMA controller, and buffer management to realize the invention as recited in claims 31 and 61. Further, no technological "leap" would have been required since it was known at the time of the invention that the industry was migrating away from analog video, and toward digital video streams (i.e. MPEG), as noted with regard to the MPEG digital encoders cited above. It should also be noted that claims 31 and 61 are drawn to a system for the simultaneous storage and playback of multimedia data (e.g. video) based on commands from a user, but do not expressly require that the commands are fast forward and reverse functions.

In summary, both Patent owner's arguments, and the Villasenor declaration appear to rely heavily on features that are not specifically required by the language of claims 31 and 61.

F. Secondary Considerations.

Patent owner also argues secondary considerations of non-obviousness based on the commercial success of the '389 Patent. While the examiner generally agrees that TiVo products were indeed successful as opined in the Barton Declaration, neither Patent owner's arguments, nor the Barton Declaration, establish a clear nexus between the merits of the claimed invention, and the proposed evidence of commercial success. Hence, the examiner finds the secondary considerations inadequate to overcome the final conclusion of non-obviousness as presented herein. In this instance, it is unclear how the commercial success relates to the claimed features such as the "source object", the "sink object", and "automatically flow controlled" that Patent owner has argued distinguish the invention over the prior art, or, how the commercial success relates to obvious features relied on in the Krause reference (i.e. parsing the video and audio data

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from the broadcast data). Accordingly, the secondary considerations do not appear to support the conclusion that claims 31 and 61 are non-obvious. (MPEP 716.01(a,b))

Background

The '389 Patent is drawn to a system and a method simultaneously storing and playing back multimedia data, such as a television broadcast program. The ability to simultaneously store and play back the program allows the user to rewind or fast forward through the program while viewing it. Fig. 1 illustrates the system. Input Module 101 receives a television input stream and outputs an MPEG formatted stream. For example, if the television input stream is an analog signal, Input Module 101 converts the signal into an MPEG format through the use of video and audio encoders. (Col. 2, lines 10-14 and Col. 3, lines 49-52.) The MPEG formatted stream is then sent to Media Switch 102. Media Switch 102 includes a "parser." The parser "parses the stream looking for MPEG distinguished events including the start of video, audio or private data segments." (Col. 5, lines 3-6.) When a video or audio segment is distinguished, the parser indexes the segment in an appropriate video or audio circular buffer represented by memory 104. (See also Fig. 4 at video buffer 410 and audio buffer 411)

Claims 31 and 61 are directed to the program logic within CPU 106 that controls the movement of data through the system. The program logic has three conceptual components as illustrated in Fig. 8 of the '389 Patent.

The '389 patent also describes the use of object-oriented programming language, e.g., the C++ programming language, to implement the program logic illustrated conceptually in Fig. 8 above. Specifically, the '389 patent describes the use of a "source object" 901, a "transform object" 902

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and a "sink object" 903 corresponding to sources 801, transforms 802 and sinks 803. (Col. 8, lines 9-18; Fig. 9.) A "control object" 917 is also employed to accept commands from the user. (Col. 9, lines 25-32.) However, the specific features relating to the claimed object-based method and apparatus now appear to be rendered obvious by the prior art now being view in a new light as set forth below. (See: Prior art rejections below)

References cited in the request

U.S. Patent 6,018,612 to Thomason et al. ("Thomason")

U.S. Patent 5,949,948 to Krause et al. ("Krause")

Prior art rejections

Claim Rejections - 35 USC § 103

(1) Claims 31 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Thomason in view of Krause.

The prior art renders obvious the elements of claim 31 as follows:

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

Thomason describes a conventional system that simultaneously stores and plays back a television program. (Col. 1, lines 28-31.) Thomason is directed to an improvement of the conventional system with respect to its use of memories. (Col. 2, lines 54-55.)

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;

Thomason discloses channel selector 1 that receives one or more television signals. (Col. 3, lines 39-43; Fig. 1.) Channel selector 1 selects the television signals desired by the user for storage and then passes the selected signals to a/d converter 2 and compressor 3. The resulting compressed data is then stored in one or more buffers 4. (Col. 3, lines 47-57.) Thus, buffer 4 meets the recited physical data source as it accepts broadcast data from an input device, i.e., channel selector 1, i.e., and temporarily stores the data.

Examiner note: The parsing of video and audio data is interpreted to mean detecting video frames and then generating an index or table of the start of the detected video frames and their storage location on a hard drive. ('389 at 2:15-20, 5:3-15)

Krause discloses an I-frame detector that detects I-frames in MPEG-formatted broadcast data and then generates a table or index of the storage locations of the detected I-frames. (Col. 5, lines 35-44; see also Col. 6, lines 31-39 and Fig. 5.) The act of identifying a certain type of a video frame and generating a table based on the identification necessarily parses the broadcast video data, i.e., the data corresponding to I-frames, and audio data, i.e., the data not detected by the I-frame detector. One of ordinary skill in the art would employ the indexing of detected I-frames, i.e., "parsing," of the MPEG-formatted data to identify I-frames from other video and audio data prior to storage in buffer 4. An I-frame provides enough information for a complete picture to be generated from the I-frame alone, in contrast to other types of frames. Knowing the locations of the I-frames in advance would allow Thomason to more efficiently perform operations such as varying speed reverse or varying speed forward by directly retrieving the appropriate I-frames for the selected speed.

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However, Thomason does not explicitly disclose that buffer 4 parses the video and audio data from the broadcast data prior to storage.

Prior art Krause discloses parsing video and audio data from broadcast data. As further explained below, Krause discloses an I-frame detector that detects I-frames in MPEG-formatted broadcast data and then generates a table or index of the storage locations of the detected I-frames. (Col. 5, lines 35-44; see also Col. 6, lines 31-39 and Fig. 5.) The act of identifying a certain type of a video frame and generating a table based on the identification necessarily parses the broadcast video data, i.e., the data corresponding to I-frames, and audio data, i.e., the data not detected by the I-frame detector. (See below)

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

Thomason discloses DMA controller 31 that transfers data from buffer 4 to buffer memory 35.

DMA controller 31 is supervised by microprocessor 24 that accesses ROM 22 to run software:

The information contained in the buffers 4 will be transferred to the buffer memory 35 under supervision of a microprocessor 24 by a DMA (direct memory access) controller 31, and is identifiable as input destined for a main memory 36, which is in the form of a hard disk arrangement. The microprocessor 24 initiates the data transfer from the buffer 4 to the buffer memory 35, and performs memory allocation in the buffer memory. The microprocessor 24 runs ROM-(read-only memory) 22 based software and makes use of a working RAM (random access memory) 23 for temporary variables, the administration of the buffer memory 35, storage of user commands and the user status, etc. (col. 3, lines 53-64.)

Thus, the operation of DMA controller 31 and microprocessor 24 through software meets the recited source object step as the operation transfers video and audio data from the physical data source, i.e., buffer 4, to buffer memory 35.

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Examiner note: The recited "source object" is interpreted to mean data from a source (e.g. a Media switch) is placed in a buffer. ('389 at 8:43-45)

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

Thomason explains that DMA controller 32 operates under the supervision of microprocessor 24 that runs software. DMA controller 32 stores and retrieves data from buffer memory 35 to a storage device, i.e., main memory 36:

Input data in the buffer memory 35 is transferred to the main memory 36 as soon as it is convenient under the supervision of the microprocessor 24 by another DMA controller 32. The stored data in main memory 36 is in due course transferred to the buffer memory 35 under supervision of the microprocessor 24 by DMA controller 32. (Col. 3, line 64 to Col. 4, line 3.)

The data stored and retrieved from main memory 36 is a data stream as Thomason discloses operating the system of Fig. 1 to simultaneously record and play a television program. Thomason further discloses that data stored on the main memory can be retrieved at a later time, thereby creating a temporal transformation. (See, e.g., Thomason at Col. 1, lines 56-59 ("If the viewer is interrupted while watching a program, for example by a telephone call or a call at the door, he can resume watching the program from the point at which he was interrupted."); see also '389 patent, at Col. 8, lines 3-8 (describing temporal transformations in the context of transforms 802).)

Examiner note: the recited "transform object" is interpreted to mean a temporal transfer of data that can be retrieved later in time. ('389 at 9:35-37)

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

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said streams;

Thomason discloses that the operation of DMA controller 31 under the supervision of microprocessor 24 - i.e., the source object - is to transfer data from buffer 4 to the buffer memory 35, with the data being "identifiable as input destined for a main memory 36." (Col. 3, lines 53-64.) The operation of DMA controller 32 as supervised by microprocessor 24 - i.e., the transform object - is to control the transfer of data to and from buffer memory 35 to main memory 36. (Col. 3, line 64 to Col. 4, line 3.) Fig. 1 of Thomason shows buffer memory 35 as being variable by the diagonal dashed lines. Thus, the source object 31/24 obtains a buffer, i.e., variable buffer memory 35, from the transform object 32/24 to fill the buffer with data identified for input to main memory 36. The source object 31/24 converts the data to a stream by successively outputting data from buffer 4 to buffer memory 35 for generating a television program.

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

Automatic flow control is taught in Thomason by teaching that data is automatically buffered (e.g. self-regulated) from buffer 4 to buffer memory 35 until the main memory 36 is available to receive data. (Col. 4, lines 43-51)

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;

Thomason discloses transferring a data stream from main memory 36 to buffer memory 35 through the operation of DMA controller 32 and microprocessor 24, i.e., the transform object. Buffer memory 35 is variable as discussed above, and DMA controller 33 under the supervision

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of microprocessor 24 through software operates to obtain the data stream buffers from the transform object. (Col. 4, lines 1-19.) Fig. 1 shows that buffer 14 receives the data from buffer memory 35. That is, the operation of DMA controller 33 and the microprocessor 24 meets the sink object step as it operates to transfer data streams from variable buffer memory 35 to buffer 14. Fig. 1 shows that buffer 14 outputs the data to decompressor 13 and d/a converter 12. If the data is in MPEG format, the decompressor would include a video decoder and an audio decoder.

Examiners note: The claimed "sink object" relates to transferring data streams from buffer memory where a "sink" simply consumes data from a buffer. ("389 at 7:50)

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

Thomason discloses that d/a converter 12 converts the signals from a digital stream to an analog signal that can be sent "to a video recorder or television." (Col. 4, lines 15-19.)

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

Thomason discloses self-regulation in that data is buffered from buffer 4 to buffer memory 35 until the main memory 36 is available to receive data. (See, e.g., Col. 4, lines 43-51) The same process applies between the transform object and the sink object as data is transferred from buffer memory 35 to buffer 14 until the main memory is available to output data. (See Col. 4, lines 52-61)

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

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

Fig. 1 of Thomason illustrates a "user interface device" 26 providing command signals to a "user command input ports" 25 connected to bus 21. Thomason discloses that conventional systems allow the user to provide commands to control viewing such as reversing or fast forwarding, i.e., control the flow of data. (Col. 1, line 45 to Col. 2, line 32.) Fig. 1 illustrates that bus 21 in turn is connected the microprocessor 24 and DMA controllers 31-33 and, thus, the commands from device 26 for controlling the flow of data are sent to the elements defined above as meeting the recited source, transform and sink objects to effect the desired commands.

Examiners note: The recited "control object" is interpreted to mean a control command from a user. ('389 at 9:23)

As explained above, Thomason does not explicitly disclose that buffer 4 parses the video and audio data from the broadcast data prior to storage.

Analogous art Krause discloses an I-frame detector that detects I-frames in MPEG-formatted broadcast data and then generates a table or index of the storage locations of the detected I-frames.

As the compressed program is received by a storage device, an I-frame detector notes the arrival of each I-frame and provides this information to a host system which may control the maintenance of a table which corresponds [sic] I-frames to particular blocks of memory in the storage device. In this way, efficient and rapid retrieval of I-frame data blocks may be provided

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by the storage controller for providing appropriate blocks of memory to the decoder for effecting various playback modes. (Col. 5, lines 35-44; *see also* Col. 6, lines 31-39 and Fig. 5.)

That is, the detector in Krause "parses" the broadcast data by identifying a specific type of video frame from broadcast data having both video and audio data and generates a table based on the detected frames. The act of identifying a certain type of a video frame and generating a table based on the identification necessarily parses the broadcast between video data, i.e., the data corresponding to I-frames, and audio data, i.e., the data not detected by the I-frame detector.

Motivation to combine

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ Krause's indexing in the system of Thomason. Thomason discloses that the selected television signals are digitized by a/d converter 2 and compressed by compressor 3 before being input to buffer 4 for storage. The skilled artisan would appreciate that compressor 3 could be an MPEG encoder or, additionally, that a received digital MPEG-formatted broadcast stream could be directly input to buffer 4 without the need for conversion and compression. One of ordinary skill in the art would employ the indexing of detected I-frames, i.e., "parsing," of the MPEG-formatted data to identify I-frames from other video and audio data prior to storage in buffer 4. An I-frame provides enough information for a complete picture to be generated from the I-frame alone, in contrast to other types of frames. Knowing the locations of the I-frames in advance would allow Thomason to more efficiently perform operations such as varying speed reverse or varying speed forward by directly retrieving the appropriate I-frames for the selected speed.

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Further, both references include teachings from the same technological arena. (i.e. simultaneously storing and watching a multimedia program) Hence, the combination would have yielded predictable results.

The prior art renders obvious the elements of claim 61 as follows:

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

Thomason describes a conventional system that simultaneously stores and plays back a television program. (Col. 1, lines 28-31.) Thomason is directed to an improvement of the conventional system with respect to its use of memories. (Col. 2, lines 54-55.)

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;

Thomason discloses channel selector 1 that receives one or more television signals. (Col. 3, lines 39-43; Fig. 1.) Channel selector 1 selects the television signals desired by the user for storage and then passes the selected signals to a/d converter 2 and compressor 3. The resulting compressed data is then stored in one or more buffers 4. (Col. 3, lines 47-57.) Thus, buffer 4 meets the recited physical data source as it accepts broadcast data from an input device, i.e., channel selector 1, i.e., and temporarily stores the data.

Examiner note: The parsing of video and audio data is interpreted to mean detecting video frames and then generating an index or table of the start of the detected video frames and their storage location on a hard drive. ('389 at 2:15-20, 5:3-15)

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Krause discloses an I-frame detector that detects I-frames in MPEG-formatted broadcast data and then generates a table or index of the storage locations of the detected I-frames. (Col. 5, lines 35-44; see also Col. 6, lines 31-39 and Fig. 5.) The act of identifying a certain type of a video frame and generating a table based on the identification necessarily parses the broadcast video data, i.e., the data corresponding to I-frames, and audio data, i.e., the data not detected by the I-frame detector. One of ordinary skill in the art would employ the indexing of detected I-frames, i.e., "parsing," of the MPEG-formatted data to identify I-frames from other video and audio data prior to storage in buffer 4. An I-frame provides enough information for a complete picture to be generated from the I-frame alone, in contrast to other types of frames. Knowing the locations of the I-frames in advance would allow Thomason to more efficiently perform operations such as varying speed reverse or varying speed forward by directly retrieving the appropriate I-frames for the selected speed.

However, Thomason does not explicitly disclose that buffer 4 parses the video and audio data from the broadcast data prior to storage.

Prior art Krause discloses parsing video and audio data from broadcast data. As further explained below, Krause discloses an I-frame detector that detects I-frames in MPEG-formatted broadcast data and then generates a table or index of the storage locations of the detected I-frames. (Col. 5, lines 35-44; see also Col. 6, lines 31-39 and Fig. 5.) The act of identifying a certain type of a video frame and generating a table based on the identification necessarily parses the broadcast video data, i.e., the data corresponding to I-frames, and audio data, i.e., the data not detected by the I-frame detector. (See below)

a source object, wherein said source object extracts video and audio data

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from said physical data source;

Thomason discloses DMA controller 31 that transfers data from buffer 4 to buffer memory 35.

DMA controller 31 is supervised by microprocessor 24 that accesses ROM 22 to run software:

The information contained in the buffers 4 will be transferred to the buffer memory 35 under supervision of a microprocessor 24 by a DMA (direct memory access) controller 31, and is identifiable as input destined for a main memory 36, which is in the form of a band disk arrangement. The microprocessor 24 initiates the data transfer from the buffer 4 to the buffer memory 35, and performs memory allocation in the buffer memory. The microprocessor 24 runs ROM-(read-only memory) 22 based software and makes use of a working RAM (random access memory) 23 for temporary variables, the administration of the buffer memory 35, storage of user commands and the user status, etc. (col. 3, lines 53-64.)

Thus, the operation of DMA controller 31 and microprocessor 24 through software meets the recited source object step as the operation transfers video and audio data from the physical data source, *i.e.*, buffer 4, to buffer memory 35.

Examiner note: The recited "source object" is interpreted to mean data from a source (e.g. a Media switch) is placed in a buffer. ("389 at 8:43-45)

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

Thomason explains that DMA controller 32 operates under the supervision of microprocessor 24 that runs software. DMA controller 32 stores and retrieves data from buffer memory 35 to a storage device, *i.e.*, main memory 36:

Input data in the buffer memory 35 is transferred to the main memory 36 as soon as it is convenient under the supervision of the microprocessor 24 by another DMA controller 32. The stored data in main memory 36 is in due course transferred to the buffer memory 35 under supervision of the microprocessor 24 by DMA controller 32. " (Col. 3, line 64 to Col. 4, line 3.)

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The data stored and retrieved from main memory 36 is a data stream as Thomason discloses operating the system of Fig. 1 to simultaneously record and play a television program. Thomason further discloses that data stored on the main memory can be retrieved at a later time, thereby creating a temporal transformation. (See, e.g., Thomason at Col. 1, lines 56-59 ("If the viewer is interrupted while watching a program, for example by a telephone call or a call at the door, he can resume watching the program from the point at which he was interrupted."); see also '389 patent, at Col. 8, lines 3-8 (describing temporal transformations in the context of transforms 802).)

Examiner note: the recited "transform object" is interpreted to mean a temporal transfer of data that can be retrieved later in time. ('389 at 9:35-37)

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;

Thomason discloses that the operation of DMA controller 31 under the supervision of microprocessor 24 - i.e., the source object - is to transfer data from buffer 4 to the buffer memory 35, with the data being "identifiable as input destined for a main memory 36." (Col. 3, lines 53-64.) The operation of DMA controller 32 as supervised by microprocessor 24 - i.e., the transform object - is to control the transfer of data to and from buffer memory 35 to main memory 36. (Col. 3, line 64 to Col. 4, line 3.) Fig. 1 of Thomason shows buffer memory 35 as being variable by the diagonal dashed lines. Thus, the source object 31/24 obtains a buffer, i.e., variable buffer memory 35, from the transform object 32/24 to fill the buffer with data identified for input to

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main memory 36. The source object 31/24 converts the data to a stream by successively outputting data from buffer 4 to buffer memory 35 for generating a television program.

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

Automatic flow control is taught in Thomason by teaching that data is automatically buffered (e.g. self-regulated) from buffer 4 to buffer memory 35 until the main memory 36 is available to receive data. (Col. 4, lines 43-51)

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;

Thomason discloses transferring a data stream from main memory 36 to buffer memory 35 through the operation of DMA controller 32 and microprocessor 24, i.e., the transform object. Buffer memory 35 is variable as discussed above, and DMA controller 33 under the supervision of microprocessor 24 through software operates to obtain the data stream buffers from the transform object. (Col. 4, lines 1-19.) Fig. 1 shows that buffer 14 receives the data from buffer memory 35. That is, the operation of DMA controller 33 and the microprocessor 24 meets the sink object step as it operates to transfer data streams from variable buffer memory 35 to buffer 14. Fig. 1 shows that buffer 14 outputs the data to decompressor 13 and d/a converter 12. If the data is in MPEG format, the decompressor would include a video decoder and an audio decoder. Examiners note: The claimed "sink object" relates to transferring data streams from buffer memory where a "sink" simply consumes data from a buffer. ("389 at 7:50)

wherein said decoder converts said streams into display signals and sends

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said signals to a display;

Thomason discloses that d/a converter 12 converts the signals from a digital stream to an analog signal that can be sent "to a video recorder or television." (Col. 4, lines 15-19.)

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

Thomason discloses self-regulation in that data is buffered from buffer 4 to buffer memory 35 until the main memory 36 is available to receive data. (See, e.g., Col. 4, lines 43-51) The same process applies between the transform object and the sink object as data is transferred from buffer memory 35 to buffer 14 until the main memory is available to output data. (See Col. 4, lines 52-61)

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.

Fig. 1 of Thomason illustrates a "user interface device" 26 providing command signals to a "user command input ports" 25 connected to bus 21. Thomason discloses that conventional systems allow the user to provide commands to control viewing such as reversing or fast forwarding, i.e., control the flow of data. (Col. 1, line 45 to Col. 2, line 32.) Fig. 1 illustrates that bus 21 in turn is connected the microprocessor 24 and DMA controllers 31-33 and, thus, the commands from device 26 for controlling the flow of data are sent to the elements defined above as meeting the recited source, transform and sink objects to effect the desired commands.

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Examiners note: The recited "control object" is interpreted to mean a control command from a user. ('389 at 9:23)

Thus, Thomason teaches all of the basic flow control operations recited in claim 31. However, and as explained above, Thomason does not explicitly disclose that buffer 4 parses the video and audio data from the broadcast data prior to storage.

Analogous art Krause discloses an I-frame detector that detects I-frames in MPEG-formatted broadcast data and then generates a table or index of the storage locations of the detected I-frames.

As the compressed program is received by a storage device, an I-frame detector notes the arrival of each I-frame and provides this information to a host system which may control the maintenance of a table which corresponds [sic] I-frames to particular blocks of memory in the storage device. In this way, efficient and rapid retrieval of I-frame data blocks may be provided by the storage controller for providing appropriate blocks of memory to the decoder for effecting various playback modes. (Col. 5, lines 35-44; *see also* Col. 6, lines 31-39 and Fig. 5.)

That is, the detector in Krause "parses" the broadcast data by identifying a specific type of video frame from broadcast data having both video and audio data and generates a table based on the detected frames. The act of identifying a certain type of a video frame and generating a table based on the identification necessarily parses the broadcast between video data, i.e., the data corresponding to I-frames, and audio data, i.e., the data not detected by the I-frame detector.

Motivation to combine

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ Krause's indexing in the system of Thomason. Thomason discloses that the selected television signals are digitized by a/d converter 2 and compressed by compressor 3 before being input to buffer 4 for storage. The skilled artisan would appreciate that compressor 3 could be an MPEG encoder or, additionally, that a received digital MPEG-formatted broadcast stream could be directly input to buffer 4 without the need for conversion and compression. One of ordinary skill in the art would employ the indexing of detected I-frames, i.e., "parsing," of the MPEG-formatted data to identify I-frames from other video and audio data prior to storage in buffer 4. An I-frame provides enough information for a complete picture to be generated from the I-frame alone, in contrast to other types of frames. Knowing the locations of the I-frames in advance would allow Thomason to more efficiently perform operations such as varying speed reverse or varying speed forward by directly retrieving the appropriate I-frames for the selected speed. Further, both references include teachings from the same technological arena. (i.e. simultaneously storing and watching a multimedia program) Hence, the combination would have yielded predictable results.

Conclusion

THIS ACTION IS MADE FINAL.

A shortened statutory period for response to this action is set to expire 2 months from the mailing date of this action.

Extensions of time under 37 CFR 1.136(a) do not apply in reexamination proceedings. The provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Further, in 35 U.S.C. 305 and in 37 CFR 1.550(a), it is required that reexamination proceedings "will be conducted with special dispatch within the Office."

Extensions of time in reexamination proceedings are provided for in 37 CFR 1.550(c). A request for extension of time must be filed on or before the day on which a response to this action is due, and it must be accompanied by the petition fee set forth in 37 CFR 1.17(g). The mere filing of a request will not effect any extension of time. An extension of time will be granted only for sufficient cause, and for a reasonable time specified.

The filing of a timely first response to this final rejection will be construed as including a request to extend the shortened statutory period for an additional month, which will be granted even if previous extensions have been granted. In no event however, will the statutory period for response expire later than SIX MONTHS from the mailing date of the final action. See MPEP § 2265.

IDS Submissions

Regarding IDS submissions MPEP 2256 recites the following: "Where patents, publications, and other such items of information are submitted by a party (patent owner or requester) in compliance with the requirements of the rules, the requisite degree of consideration to be given to such information will be normally limited by the degree to which the party filing the information citation has explained the content and relevance of the information." Accordingly, the IDS submissions have been considered by the Examiner only with the scope required by MPEP 2256.

Art Unit: 3992

In certain instances, the examiner has "lined through" references because they do not meet the requirements of being a Patent or Printed Publication (e.g. court papers and other evidence that is not NPL). However, these references have been made of record in the proceeding and are given due consideration.

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR § 1.52(a) and (b), and must contain any fees required by 37 CFR § 1.20(c). See MPEP § 2250(IV) for examples to assist in the preparation of proper proposed amendments in reexamination proceedings.

Service of Papers

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550.

Notification of Concurrent Proceedings

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. 6,233,389 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.

Application/Control Number: 90/009,329

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Art Unit: 3992

All correspondence relating to this ex parte reexamination proceeding should be directed:

By Mail to:

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
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 should be directed to the Central

Reexamination Unit at telephone number (571) 272-7705.

Fred Ferris
Primary Examiner
AU 3992

Conferees:

ESK

EBK



Substitute for form 1449/PTO		Complete if Known			
INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>		Application Number	90/009,329		
		Filing Date	November 10, 2008		
		First Named Inventor	James M. BARTON		
		Art Unit	3992		
		Examiner Name	Ferris III, Fred O.		
Sheet	1	of	2	Attorney Docket Number	2513.002REX0

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
3	US40	2001/0013120 A1	08-09-2001	Tsukamoto	
	US41	2002/0003949 A1	01-10-2002	Mamiya <i>et al.</i>	
	US42	2002/0012531 A1	01-31-2002	Flannery	
	US43	2002/0056118 A1	05-09-2002	Hunter <i>et al.</i>	
	US44	2002/0144265 A1	10-03-2002	Connelly	
	US45	2003/0040962 A1	02-27-2003	Lewis	
	US46	2004/0193900 A1	09-30-2004	Nair	
	US47	2010/0080529 A1	04-01-2010	Barton <i>et al.</i>	
	US48	5,124,854	06-23-1992	Iyota <i>et al.</i>	
	US49	5,222,150	06-22-1993	Tajima	
	US50	5,317,556	05-31-1994	Tsuboi <i>et al.</i>	
	US51	5,363,362	11-08-1994	Maeda <i>et al.</i>	
	US52	5,475,656	12-12-1995	Sato <i>et al.</i>	
	US53	5,479,056	12-26-1995	Mabuchi	
	US54	5,486,687	01-23-1996	Le Roux	
	US55	5,488,433	01-30-1996	Washino <i>et al.</i>	
	US56	5,506,902	04-09-1996	Kubota	
	US57	5,546,250	08-13-1996	Diel	
	US58	5,572,442	11-05-1996	Schulhof <i>et al.</i>	
	US59	5,761,372	06-02-1998	Yoshinobu <i>et al.</i>	

FOREIGN PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code ³ Number ⁴ Kind Code ⁵ (if known)			
2	FP20	EP 0 784 400 A2	07-16-1997	Wong	
	FP21	JP 61-133089 A	06-20-1986	Kobune <i>et al.</i>	
	FP22	JP 2-266774 A	10-31-1990	Iwasaki	
	FP23	JP 3-34685 A	02-14-1991	Kanazawa <i>et al.</i>	
4	FP				
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Examiner Signature		Date Considered	6/1/10
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		Filing Date	November 10, 2008
		First Named Inventor	James M. BARTON
		Art Unit	3992
		Examiner Name	Ferris III, Fred O.
		Attorney Docket Number	2513.002REX0
Sheet	2	of	2

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		Number-Kind Code ² (if known)			
2	US60	5,796,695	08-18-1998	Tsutsui	
	US61	5,856,930	01-05-1999	Hosono	
	US62	5,870,710	02-09-1999	Ozawa <i>et al.</i>	
	US63	5,914,941	06-22-1999	Janky	
	US64	6,028,774	02-22-2000	Shin <i>et al.</i>	
	US65	6,332,175 B1	12-18-2001	Birrell <i>et al.</i>	
	US66	6,496,647 B2	12-17-2002	Arai <i>et al.</i>	
	US67	6,535,465 B1	03-18-2003	Shigetomi <i>et al.</i>	
	US68	6,694,200 B1	02-17-2004	Naim	
	US69	6,697,944 B1	02-24-2004	Jones <i>et al.</i>	
	US70	6,704,493 B1	03-09-2004	Matthews <i>et al.</i>	
	US71	6,748,539 B1	06-08-2004	Lotspiech	
	US72	6,865,431 B1	03-08-2005	Hirota <i>et al.</i>	
	US73	6,959,221 B1	10-25-2005	Kataoka	
	US74	6,993,567 B1	01-31-2006	Yodo <i>et al.</i>	
3	US75	7,050,705 B1	05-23-2006	Mori	
	US76	7,607,157 B1	10-20-2009	Inoue <i>et al.</i>	
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FOREIGN PATENT DOCUMENTS					
Examiner Initials ¹	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code ³ Number ⁴ Kind Code ⁵ (if known)			
	FP				
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		First Named Inventor	James M. BARTON
		Art Unit	3992
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		Attorney Docket Number	2513.002REX0
Sheet	1	of	1
NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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 ²
	NPL57	INTELLECTUAL PROPERTY LIBRARY, " <u>Sitrick Vs. Dreamworks LLC</u> ," (CAFC) 85 USPQ2d, 1826, revised February 5, 2008, 9 pages.	
3	NPL58	English language abstract for Japanese Patent Publication No. JP 61-133089 A, published June 20, 1986, 2 pages.	
3	NPL59	English language abstract for Japanese Patent Publication No. JP 2-266774 A, published October 31, 1990, 2 pages.	
3	NPL60	English language abstract for Japanese Patent Publication No. JP 3-34685 A, published February 14, 1991, 2 pages.	
	NPL61	U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <u>Tivo Inc. v. Echostar Corporation et al.</u> , 2009-1374, Order Granting Petition For Rehearing En Banc, May 14, 2010.	
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Examiner Signature		Date Considered	6/1/10
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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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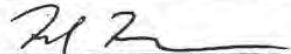
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		First Named Inventor	James M. BARTON		
		Art Unit	3992		
		Examiner Name	Ferris III, Fred O.		
Sheet	1	of	1	Attorney Docket Number	2513.002REX0
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	NPL55	Office Communication, dated February 2, 2010, for U.S. Patent Appl. No. 10/418,646, filed April 18, 2003, 12 pages.			
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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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		Art Unit	3992		
		Examiner Name	Ferris III, Fred O.		
Sheet	1	of	1	Attorney Docket Number	2513.002REX0

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		Number-Kind Code ² (If Known)			
4	US23	2002/0164156 A1	11-07-2002	Bilbrey	
	US24	2002/0176690 A1	11-28-2002	Nagasawa	
	US25	2005/0132418 A1	06-16-2005	Barton <i>et al.</i>	
	US26	2006/0045470 A1	03-02-2006	Poslinski <i>et al.</i>	
	US27	2007/0230921 A1	10-04-2007	Barton <i>et al.</i>	
	US28	2009/0136215 A1	05-28-2009	Barton <i>et al.</i>	
	US29	2009/0208185 A1	08-20-2009	Barton <i>et al.</i>	
	US30	4,233,628	11-11-1980	Ciciora	
	US31	4,306,250	12-15-1981	Summers <i>et al.</i>	
	US32	5,406,626	04-11-1995	Ryan	
4	US33	5,590,195	12-31-1996	Ryan	
	US34	5,659,653	08-19-1997	Diehl <i>et al.</i>	
	US35	5,751,806	05-12-1998	Ryan	
	US36	5,815,671	09-29-1998	Morrison	
	US37	6,330,334	12-11-2001	Ryan	
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FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³ Number ⁴ Kind Code ⁵ (If known)				
	FP					
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Examiner Signature	<i>212</i>	Date Considered	6/1/10
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	NPL49	U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <u>TiVo Inc. v. Echostar Communications Corp. et al.</u> , Brief of Defendants-Appellants, July 17, 2009.			
	NPL50	U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, <u>TiVo Inc. v. Echostar Communications Corp. et al.</u> , Brief of Plaintiff-Appellee Tivo Inc., July 17, 2009.			
	NPL51	U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Complaint for Patent Infringement and Jury Demand, Tivo Inc. v. Verizon Communications, Inc., Case No. 2:09-cv-257, August 26, 2009.			
	NPL52	U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Complaint for Patent Infringement and Jury Demand, Tivo Inc. v. AT&T Inc., Case No. 2:09-cv-259, August 26, 2009.			
	NPL53	Office Communication, dated September 15, 2009, for U.S. Patent Appl. No. 11/051,347, filed February 4, 2005, 18 pages.			
	NPL54	U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, AT&T Inc.'s Answer to Plaintiff's Complaint and Jury Demand, Tivo Inc. v. AT&T Inc., Case No. 2:09-cv-259, October 21, 2009.			
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

1024658_1.DOC

Reexamination 	Application/Control No. 90/009,329	Applicant(s)/Patent Under Reexamination 6233389
	Certificate Date	Certificate Number

Requester Correspondence Address: ☐ Patent Owner ☒ Third Party
MORRISON & FOERSTER LLP 555 West Fifth Street, Suite 3500 Los Angeles, California 90013

LITIGATION REVIEW ☒	FOF (examiner initials)	1/6/09 (date)
Case Name		Director Initials
Open: 1:08cv327 Dish Network Corporation et al v. Tivo Inc		<i>See Feast for GM</i>
Closed: 1:05cv2799 Tivo, Inc v. Echostar Communications Corporation et al		
Closed: 1:05mi208 Tivo, Inc v. Echostar Communications Corporation et al		
Closed: 1:05mi190 Tivo, Inc v. Echostar Communications Corporation et al		
Open: 2:04cv1 Tivo Inc v. Echostar Comm, et al Open: 3:02cv365 Tivo Inc, v. Sonicblue Incorporated et al Closed: 4:02cv365		

COPENING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
1.	
2.	
3.	
4.	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Barton et al.
U.S. Patent No.: 6,233,389
Issue Date: May 15, 2001
Serial No.: 09/126,071
Filing Date: July 30, 1998
Reexam Control No.: 90/009,329
Title: MULTIMEDIA TIME WARPING SYSTEM

Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR EXTENSION OF TIME

Pursuant to 37 C.F.R. § 1.550(c), the Patent Owner respectfully requests that the time for responding to the pending office action in the above-identified reexamination be extended from August 4, 2010 to September 9, 2010. The Patent Owner is requesting a 35 day extension rather than a one month extension because a one month extension would cause the due date to fall on Labor Day weekend, during which the Patent Owner will have limited access to the legal team and technical experts in light of previously scheduled family obligations. This is the first request for an extension of time. It is believed that the following circumstances provide sufficient cause for the requested extension and that the time of the extension is reasonable under those circumstances.

The Patent Owner has been diligently preparing a response to the pending office action. The Patent Owner has analyzed in detail the positions set forth in the 31 page office action and reviewed the various new references relied upon by the examiner in the rejection. (*See, e.g., Office Action pp. 5, 9, and 11, citing the DMA Embedded Systems, Sasaki, Nelson, and Leek references*) The Patent Owner has prepared a preliminary set of arguments for submission in response to the office action, initiated various searches to identify additional documentary evidence in support of those positions, and initiated discussions of the technical issues with appropriate experts.

In order to prepare a full and complete response to the office action and properly represent the Patent Owner's interests in this matter, it will also be necessary to conduct an examiner interview with technical experts in attendance and to prepare at least two Rule 132 declarations setting forth detailed explanations in rebuttal of the positions set forth in the office action. The declarations will address the relatively complex technical issues identified in the office action, including the relevant aspects of the operation of Thomason's DMA controller and whether one skilled in the art would combine the Thomason system with the I-frame detector of Krause, as well as the specific reasons why a nexus exists between the previously identified commercial success and the claimed invention.

The technical experts, including the lead inventor James Barton and former declarant John Villasenor, are unable to provide the requisite assistance between the date of this request and the expiration of the response period due to previous commitments including certain obligations involving ongoing legal proceedings at the International Trade Commission. Messrs. Barton and Villasenor are unable to devote the time needed to prepare declarations under Rule 132 prior to August 4, 2010, the current deadline for the Patent Owner's response to the office action.

An additional reason justifying the requested extension of time is the volume of allegedly relevant documents submitted in connection with two co-pending lawsuits which must be reviewed to assess their impact on the issues raised in the office action and the Patent Owner's reply thereto. The above-referenced patent is the subject of *TiVo Inc. v. AT&T Inc. and Microsoft Corp.*, Case No. 209-CY-259- DF, pending in the United States District Court for the Eastern District of Texas, and in that case the defendants recently submitted over 2,000 pages of invalidity contentions and non-patent literature in addition to approximately 20 new patent references. The materials were promptly submitted to the Examiner via the June 2, 2010 Information Disclosure Statement and the Patent Owner is in the process of analyzing the references and contentions to assess their potential impact on the pending response to office action. Additional time is needed to fully consider the references in order to ensure that the Patent Owner's statements concerning the teachings of the prior art, and the shortcomings thereof, are consistent with the disclosures of the scores of new prior art references produced

by the defendants in that case. It is also necessary to consider whether the prior art references lend material support to Patent Owner's positions concerning the state of the art, whether one skilled in the art would consider certain features to meet the claim language, and whether a skilled artisan would combine the Thomason and Krause references in the manner alleged by the examiner.

The requested extension of time should enable the Patent Owner to address the foregoing issues. Both of the above-referenced experts have availability to provide the needed assistance in the second half of August and the undersigned has accordingly submitted a request to the examiner for an interview during that time period. The Patent Owner believes that the requested extension will provide sufficient time to complete the referenced searches, collaborate with the technical experts, prepare for and attend the examiner interview, and prepare the formal office action response and Rule 132 declarations.

A final factor militating in favor of the extension are the other obligations of the undersigned lead attorney involved with the preparation of the office action response which taken collectively have substantially limited his ability to collaborate with other team members during the response period. The lead attorney has had numerous prior commitments to other clients on which the clients required the undersigned's advice during the time the current office action has been pending. Since the lead attorney also has been the lead attorney on these other matters, in some cases for many years, he necessarily has had to handle all of these matters personally. Compounding the foregoing is the fact that during the response period the undersigned has been in the process of transitioning clients from his previous firm. The lead attorney joined his current firm about one and a half months before the office action issued and the substantial administrative burden associated with the file transfers, docketing and related issues has persisted to the date of this request.

As noted above, a one month extension would cause the due date to land on September 4, 2010, which is the Saturday of Labor Day weekend. The date for submitting the response to office action would thus carry over to Tuesday, September 7, 2010. The Patent Owner's legal team as well as the technical experts in this matter will have quite limited availability during the holiday weekend and it thus will be difficult to secure the needed attention from the

appropriate persons in the days leading up to the filing deadline. The Patent Owner thus requests that the period for response be extended an additional two business days, or until September 9, 2010.

In view of the above circumstances, the Patent Owner requests approval of its request for an extension to September 9, 2010 of the time to respond to the pending office action in the present reexamination.

The Director is authorized to charge any fees or credit any overpayments to Deposit Account No. 09-0946.

Respectfully submitted,

Dated: July 13, 2010

/Greg H. Gardella/
Greg H. Gardella
Reg. No. 46,045

Irell & Manella
1800 Avenue of the Stars
Suite 900
Los Angeles, CA 90067-4276
310.203.7915

CERTIFICATE OF SERVICE

I hereby certify that on July 13, 2010, I caused a true and correct copy of the foregoing REQUEST FOR AN EXTENSION OF TIME to be served via First Class U.S. Mail on the following:

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

Date: July 13, 2010

/Greg H. Gardella/
Greg H. Gardella
Reg. No. 46045

Electronic Acknowledgement Receipt	
EFS ID:	8009579
Application Number:	90009329
International Application Number:	
Confirmation Number:	2859
Title of Invention:	MULTIMEDIA TIME WARPING SYSTEM
First Named Inventor/Applicant Name:	6233389
Customer Number:	26111
Filer:	Greg H. Gardella/Karen Heikkila
Filer Authorized By:	Greg H. Gardella
Attorney Docket Number:	2513.002REX0
Receipt Date:	13-JUL-2010
Filing Date:	10-NOV-2008
Time Stamp:	23:38:29
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		TiVoFinal.pdf	181387	yes	5
			014dc62d7c206a1399391fa22f9cc8372076 .size2		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Reexam Request for Extension of Time	1	4
	Reexam Certificate of Service	5	5
Warnings:			
Information:			
Total Files Size (in bytes):		181387	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/009,329	11/10/2008	6233389	2513.002REX0	2859
26111	7590	07/21/2010	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C. 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005				
ART UNIT			PAPER NUMBER	

DATE MAILED: 07/21/2010

Please find below and/or attached an Office communication concerning this application or proceeding.



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THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS
MORRISON & FOERSTER LLP
DAVID L. FEHRMAN
555 WEST FIFTH STREET
LOS ANGELES, CA 90013

Date:

MAILED

JUL 21 2010

CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90009329
PATENT NO. : 6233389
ART UNIT : 3992

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)).



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MAILED

JUL 21 2010

CENTRAL REEXAMINATION UNIT

STERNE, KESSLER, GOLDSTEIN : (For Patent Owner)
& FOX P.L.L.C. :
1100 NEW YORK AVENUE, N.W. :
WASHINGTON DC 20005 :

MORRISON & FOERSTER, LLP : (For Third Party Requester)
555 WEST FIFTH STREET :
SUITE 3500 :
LOS ANGELES, CA 90013-1024 :

In re: Barton et alia : DECISION
Ex Parte Reexamination Proceeding : GRANTING
Control No. 90/009,329 : PETITION FOR EXTENSION
Deposited on: 10 November 2008 : OF TIME
For: US Patent No. 6,233,389 : [37 CFR §§ 1.550(c) & 1.181]

This is a decision on the 13 July 2010 petition entitled, "Request For Extension of Time" under 37 CFR § 1.550(c) requesting the response period for response be extended by thirty-five (35) days. The petition was timely filed with certificate of service and fee.

The petition is before the Director of the Central Reexamination Unit for consideration.

The petition is granted for the reasons set forth below.

DECISION

The Patent Owner's representative requests the period for response to be extended by thirty-five (35) days for responding to the Final Office action dated 04 June 2010, which sets two (2) months time for filing a response thereto. The petition for extension of time was timely filed on 13 July 2010, together with authorization for the \$200.00 petition fee as required by 37 CFR § 1.550(c) and 37 CFR § 1.17 (g). A certificate of service was not provided with the petition.

The request is hereby granted.

CITATION OF RELEVANT AUTHORITY

37 CFR § 1.550 (c) states:

(c) The time for taking any action by a patent owner in an *ex parte* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified. Any request for such extension must be filed on or before the day on which action by the patent owner is due, but in no case will the mere filing of a request effect any extension. Any request for such extension must be accompanied by the petition fee set forth in § 1.17(g). See § 1.304(a) for extensions of time for filing a notice of appeal to the U.S. Court of Appeals for the Federal Circuit or for commencing a civil action.

Addressing the requirement of 37 CFR § 1.550 (c) to make a showing of "sufficient cause" to grant an extension of time request, **MPEP § 2265** states, in pertinent part:

Evaluation of whether sufficient cause has been shown for an extension must be made in the context of providing the patent owner with a fair opportunity to present an argument against any attack on the patent, and the requirement of the statute (35 U.S.C. § 305) that the proceedings be conducted with special dispatch.

Any request for an extension of time in a reexamination proceeding must fully state the reasons therefor. The reasons must include (A) a statement of what action the patent owner has taken to provide a response, to date as of the date the request for extension is submitted, and (B) why, in spite of the action taken thus far, the

requested additional time is needed. The statement of (A) must provide a factual accounting of reasonably diligent behavior by all those responsible for preparing a response to the outstanding Office action within the statutory time period. All requests must be submitted in a separate paper which will be forwarded to the CRU or TC Director for action. A request for an extension of the time period to file a petition from the denial of a request for reexamination can only be entertained by filing a petition under 37 CFR § 1.183 with appropriate fee to waive the time provisions of 37 CFR § 1.515(c). Since the reexamination examination process (for a reexamination request filed under 35 U.S.C. § 302 and 37 CFR 1.510) is intended to be essentially *ex parte*, the party requesting reexamination can anticipate that requests for an extension of time to file a petition under 37 CFR § 1.515(c) will be granted only in extraordinary situations....

ANALYSIS AND FINDINGS

The patent owner petitions to extend the period for response by adding thirty-five (35) days to the period for response. The decision to extend the period for response is evaluated based upon a showing of "sufficient cause." There is always the consideration to balance the need for the patent owner to have a fair opportunity to respond to the Office action between the need for special dispatch.

The petition relates the actions taken thus far and notes additional time is needed because the technical expert assisting in the proceeding has scheduling conflicts and patent owner seeks to provide declarations under 37 CFR § 1.132 which requires additional time to prepare the declarations. On balance, the petition supports the requirement for "sufficient cause" to grant a one (1) month extension of time.

The petition request to extend the response time is hereby granted.

CONCLUSION

1. The patent owner's petition for extension for thirty-five (35) days time in which to file a response to the Final Office action dated 04 June 2010 is hereby granted.

2. The period for response is extended by thirty-five (35) days.
3. The response is due 09 September 2010.
4. All correspondence involving this proceeding may be addressed to the following:

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
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

By EFS: Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at <https://sportal.uspto.gov/authenticate/authenticateuserlocalepf.html>. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

5. Telephone inquiries with regard to this decision should be directed to Mark Reinhart, at (571) 272-1611, in the absence of Mark Reinhart calls may be directed to Eric Keasel, at (571) 272-4929, or Jessica Harrison, at (571) 272-4449, all are Supervisory Patent Examiners in the Central Reexamination Unit, Art Unit 3992.

/Mark Reinhart/

Mark Reinhart,
Supervisory Patent Examiner,
AU 3992,
Central Reexamination Unit
571-272-1611



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/009,329	11/10/2008	6233389	2513.002REX0	2859
26111	7590	08/25/2010	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C. 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			ART UNIT	PAPER NUMBER

DATE MAILED: 08/25/2010

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MORRISON & FOERSTER LLP

555 West Fifth Street, Suite 3500

Los Angeles, California 90013

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. 90/009,329.

PATENT NO. 6233389.

ART UNIT 3992.

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)).

Ex Parte Reexamination Interview Summary	Control No.	Patent Under Reexamination	
	90/009,329	6233389	
	Examiner	Art Unit	
	Fred Ferris	3992	

All participants (USPTO personnel, patent owner, patent owner's representative):

- (1) Fred Ferris (PTO) (3) Jim Barton (TIVO), John Villasenor (UCLA)
 (2) Eric Keasel, Eric Kiss (PTO) (4) Greg Gardella (PO Rep.)

Date of Interview: 25 August 2010

Type: a) ☐ Telephonic b) ☐ Video Conference
 c) ☒ Personal (copy given to: 1) ☐ patent owner 2) ☐ patent owner's representative)

Exhibit shown or demonstration conducted: d) ☒ Yes e) ☐ No.

If Yes, brief description: Binder/Slides

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.
 Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to..."

Claim(s) discussed: 31 and 61.

Identification of prior art discussed: Thomason, Krause.

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:
See Continuation Sheet.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN **ONE MONTH** FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW (37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNER'S STATEMENT CAN NOT BE WAIVED. **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

cc: Requester (if third party requester)

Continuation of Description of the general nature of what was agreed to if an agreement was reached, or any other comments: Patent owner presented arguments directed toward the meaning of automatic flow control as used in the '389 patent. Patent owner argued that the claimed automatic flow control differed from Thomason and a Synchronous DMA (ready) transfer in that the flow control of the '389 patent was proactive and centralized between the objects. The PTO representatives indicated that arguments directed toward the source, sink and transform objects and automatic flow control in light of the express teachings of the '389 specification would help clarify the claims over Thomason and Krause. (e.g. objects are "multi-threaded" and run in parallel to flow control the pipeline as disclosed at 8:17-25 of the '389 Patent). Patent owner agreed to file a supplemental amendment addressing these issues and clarifying the nexus between the automatic flow control and secondary considerations of commercial success. .

A handwritten signature in black ink, appearing to be "JL F", written in a cursive style.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Barton et al.
U.S. Patent No.: 6,233,389
Issue Date: May 15, 2001
Serial No.: 09/126,071
Filing Date: July 30, 1998
Reexam Control No.: 90/009,329
Title: MULTIMEDIA TIME WARPING SYSTEM

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Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO OFFICE ACTION

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being transmitted via electronic filing (EFS-Web) on: September 9, 2010.

LISTING OF PATENT CLAIMS UNDER REEXAMINATION

31. (ORIGINAL PATENT CLAIM) 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;

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.

61. (ORIGINAL PATENT CLAIM) 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 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;

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

- 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;

- 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.

REMARKS

INTRODUCTION

The June 4, 2010 Office Action rejects claims 31 and 61 as obvious over US 6,018,612 to Thomason et al. ("Thomason") in view of US 5,949,948 to Krause et al. ("Krause"). The Office Action proposes that Thomason's buffer management scheme meets the claim recitation that a transform object automatically flow controls source and sink objects and further proposes that a person skilled in the art would modify the Thomason system to include the I-frame detector of Krause. Additionally, the Office Action contends that the combined system would include a synchronous DMA controller which would assert a "ready line" in a manner that meets the claim recitations.

As outlined in the Second Villasenor declaration, given the well-understood meaning of the term object and the recited centralized transform object architecture, Thomason fails to meet the claim language for various independent reasons. First, Thomason lacks a transform object that intelligently manages buffers or the manipulation of the video and audio data so as to facilitate the system's ability to handle asymmetric memory demands of the source and sink objects. Second, one skilled in the art would not have used a synchronous DMA controller in the Thomason system and thus the combined system would not meet the automatic flow control limitations as suggested in the Office Action. Third, even if such a DMA controller was used in the Thomason system, the ready line assertion would not affect the flow but would rather be a function of the flow and thus would not provide the recited automatic flow control. Fourth, the ready line in the asserted combined system is not part of and does not have any interaction with the alleged transform object. Lastly, even if Thomason otherwise met the "transform object" limitation, that combined structure would still fail to provide the recited "automatic flow control" on the output side.

Additionally, it is legally and technically inappropriate to combine Thomason and Krause in the first instance. The Thomason system is architecturally incompatible with the Krause I-frame detector and attempting to combine them would create numerous fundamental technical problems. While it may be theoretically possible to dissect Thomason and Krause into

their component parts and reassemble them into a new and different operable system, such combinations are plainly impermissible accordingly to the MPEP. (MPEP § 2143.01) Moreover, given that Thomason already has fast forward and reverse functionality, any advantage that might derive from the addition of Krause's I-frame detector is far outweighed by the combined system's additional cost and complexity. According to the *2010 KSR Guidelines Update* this militates strongly against a finding of obviousness. (75 Fed. Reg. 53646) This conclusion is reinforced by the fact that the owner of the Thomason patent opted to license the '389 patent instead of attempting to modify the Thomason system as proposed by the Office Action. (See Second Barton Dec. ¶14)

The extraordinary commercial success, previously demonstrated, is a direct result of the recited transform object architecture and automatic flow control. As explained in detail in the Second Barton Declaration, the transform object architecture and automatic flow control enabled smooth control of live TV, which was one of the primary drivers of the commercial demand for the TiVo DVR. Another principal driver was the price point at which the system was offered. The TiVo DVR was reasonably priced in part due to the fact that the transform object architecture conserved on memory. The confluence of these two factors, both of which derive directly from the recited transform object architecture, drove the commercial success of the TiVo product. (*See generally* Second Barton Dec.)

The remaining secondary considerations evidence is equally compelling. The '389 patent was selected for inclusion in the USPTO Museum and it has been licensed by numerous leading consumer electronics companies (Sony, Philips, Toshiba, Pioneer, etc.) as well as the leading US cable and satellite operators (Comcast, DIRECTV, etc.). Additionally, the '389 patent has been adjudged not invalid by the courts and major corporations have invested over half a billion dollars into TiVo based substantially on the strength of the '389 patent. (*See generally* Second Barton Dec.)

As more fully explained below, these facts demonstrate beyond doubt that the claimed subject matter is at once innovative, nonobvious, and revolutionary.

NEITHER THOMASON NOR KRAUSE TEACH A TRANSFORM OBJECT THAT AUTOMATICALLY FLOW CONTROLS SOURCE AND SINK OBJECTS

Claims 31 and 61 stand rejected as being unpatentable over Thomason in view of Krause. The June 4, 2010 Office Action asserts that Thomason teaches all elements of claims 31 and 61 except for the recitation that the physical data source “parses video and audio data from said broadcast data.” (OA at 29) As to the parser limitation, the Office Action states that “[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to employ Krause's indexing in the system of Thomason.” (OA at 21)

The Office Action also expands on the rejection with respect to the recitation that the “source object is automatically flow controlled by said transform object” and the recitation that the “sink object is automatically flow controlled by said transform object.” The Office Action asserts that

[a] skilled artisan would also know that, in a traditional synchronous DMA transfer, handshaking (e.g. via a “ready” line and program control) is the way the DMA controller “regulates” the data transfer between memories. (See: DMA (Embedded Systems) page 3, paragraphs 3-4, of record) Hence a skilled artisan would understand that the DMA controller can be thought of as “self regulating” during any traditional DMA data transfer operation.

(OA at 5) The Office Action is thus understood to assert that a skilled artisan would consider it obvious to use a synchronous DMA as taught in the DMA Embedded Systems reference in place of the DMA controller(s) taught in Thomason.

Claims 31 and 61 recite an architecture in which the transform object is centrally disposed in the sense that it automatically flow controls both the source object on the input side, and also the sink object on the output side. The claims require that both the “source object,” which among other things extracts video and audio data from the physical data source, and the “sink object,” which among other things outputs streams to a video and audio decoder, are “automatically flow controlled by said transform object.” The recited transform object is thus centrally disposed in the sense that it automatically flow controls both the source object and the sink object. Stated another way, the same transform object automatically flow controls both the source object on the input side as well as the sink object on the output side.

Hereinafter these recited architectural limitations are collectively referred to as the “centralized transform object.”

Within the definition set forth in the Office Action, those of skill in the art would understand that the recited “objects” are functionally interrelated sets of state information typically sets of variable values which include information concerning the state or progress of the operations that manipulate the state information. (Second Villasenor Dec. ¶¶12-17) This flows directly from the well-understood meanings of the respective terms used in the definition set forth in the Office Action. (Id.) Therein it was noted that the term “object” was given “the widely accepted computer science meaning of a ‘collection of data and operations.’” (OA at 3) The terms “collection,” “data,” and “operations” likewise have widely accepted meanings that provide further context and meaning to the term “object.” (Id.) As explained in the Second Declaration of Professor John Villasenor, submitted herewith, the term “collection” would be clearly understood in this context to mean a set of functionally interrelated items. (Second Villasenor Dec. ¶16) This understanding of the term “collection” is supported throughout the ‘389 patent specification, in particular by the exemplary object class hierarchy depicted in Figure 9 and the associated passages in the detailed description explaining that in the preferred embodiment “[e]ach object (source 901, transform 902, and sink 903) is multi-threaded by definition and can run in parallel.” (Id.; ‘389 patent 8:16-18) The term “data” would be clearly understood in this context to refer to sets of variable values or state information that reflects, among other things, the state or progress of the hardware or software operations. (Second Villasenor Dec. ¶¶13-16) This is likewise consistent with the specification of the ‘389 patent, which discusses at length the maintenance of data and pointers and passing of events between objects. (Id.; see, e.g., ‘389 patent 8:21-23, 34, 9:5-31, 10:1-18) In the preferred embodiment, for example, a “pause” event is passed to the source object, which changes the state of the receiving source object. (Id.; ‘389 patent 8:21-26) Lastly, the term “operations” would be clearly understood in this context to refer to software or hardware operations that manipulate the set of values or state information. (Id.) This understanding is consistent with the aforementioned portions of the ‘389 patent, which detail embodiments in which the variable

values, reflecting state information, are maintained and manipulated. (Id.; see, e.g., '389 patent 8:21-23, 34, 9:5-31, 10:1-18)

The claims further recite that the centralized transform object “automatically flow controls” the source and sink objects. One of skill in the art would understand that the recited centralized transform object intelligently manages buffers or the manipulation of the video and audio data so as to facilitate the system’s ability to handle asymmetric memory demands of the source and sink objects.¹ The specification explains that the “pipeline,” which includes the recited source/transform/sink object architecture, is “self-regulating” with respect to the flow of data down the pipeline. ('389 patent 8:47-51, 11:24-25) The flow control in the preferred embodiment occurs asynchronously with respect to the underlying video and audio data stream. (Second Villasenor Dec. ¶18; '389 patent 8:24-31) The specification explains that the centralized, flow-controlling transform object “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.” ('389 patent 8:28-31) Executing such “trick play” functions typically places asymmetric, asynchronous demand on the memory to provide the data required and render the frames required by the selected function. (Second Villasenor Dec. ¶19) The fact that the centralized transform object automatically flow controls on both the input side and the output side enables intelligent management to service asymmetric output demands during, for example, trick play operations. (Second Villasenor Dec. ¶¶9-10)

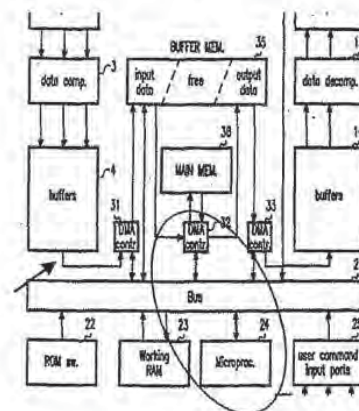
Thomason lacks any such centralized transform object that intelligently manages buffers or the manipulation of the video and audio data so as to facilitate the system’s ability to handle asymmetric memory demands of the source and sink objects. (Second Villasenor Dec. ¶18) First, Thomason teaches the opposite of flow control – the buffer management scheme simply reacts to the flow. (Id.) Thomason’s data path avoids the bus 21, where in the Thomason system the data flow might be affected. (Second Villasenor Dec. ¶¶19-20) Rather, the Thomason system is designed around a FIFO architecture wherein the data is passed from input

¹ In the case *TiVo Inc. v. EchoStar Communications Corp., et al.*, Case No. 2-04cv01 DF, and the proceedings related thereto Patent Owner has noted how the recited “automatic flow control” can minimize data loss, which is a benefit of the centralized transform object and automatic flow control architecture relevant to the issues presented in that case. Those representations are believed to be entirely consistent with the discussion of the related claim terms presented herein.

buffer 4 to buffer memory 35 to output buffer 14 in a sequential manner. (Id.) In other words, Thomason has no ability to control the flow – it simply passes data buffers in response to it. (Second Villasenor Dec. ¶120) Thomason merely reacts to input data rate and discards the output data in the event output-side memory demands conflict with input-side memory demands. (Second Villasenor Dec. ¶¶21-22; Thomason at 6:5-12) Accordingly, the Thomason system lacks the recited centralized transform object that intelligently manages buffers or the manipulation of the video and audio data so as to facilitate the system's ability to handle asymmetric memory demands of the source and sink objects.

As noted above, the Office Action suggests that that the synchronous DMA ready line architecture might be used in connection with Thomason. However, one skilled in the art would not have used the asserted synchronous DMA in the Thomason system because, as explained in the DMA Embedded Systems reference itself, “[t]he hardware moves one byte or word between memory and I/O each time the I/O port signals it is ready for another transaction. . . . Then, the DMA controller goes idle again, waiting for another ready signal from the port.” (DMA Embedded Systems at 3; Second Villasenor Dec. ¶123) This controller architecture would be considered unsuitable for inclusion in the Thomason system because it is relatively slow whereas the Thomason architecture is premised on maximization of data rate through the FIFO pipeline. (Id: Thomason at 2:59 to 3:8) Accordingly, one skilled in the art would not have used the asserted synchronous DMA in the Thomason system. (Id.)

Even if such a DMA controller was used in the Thomason system, the assertion of the ready line would be a **function** of the data flow; it would not control data flow. (Second Villasenor Dec. ¶124) In such a combined system the ready line would be asserted in the location indicated by the arrow in the figure shown at right. (Id.) The buffer 4 would present the ready line when data was available for DMA controller to read and DMA controller 31 would react to the ready line assertion by transferring that data to buffer 35. (Id.) Again, this ready line assertion would not control the flow but rather it would be a function of the flow. (Id.)



Moreover, as also shown in the illustration, the alleged “ready line” is not part of and does not even have any interaction with the alleged transform object, CPU 24 acting in combination with DMA 32. (Second Villasenor Dec. ¶125) The Office Action states that the centralized transform object limitation is met by Thomason in that “DMA controller 32 operates under the supervision of microprocessor 24.” (OA at 24) The ready line in the asserted combination, though, is not part of the alleged transform object. (Second Villasenor Dec. ¶125) The claims require that the centralized transform object automatically flow controls the source and sink, and here it can readily be seen that the asserted ready line functionality cannot fairly or reasonably be said to be part of a centralized transform object. (Id.) Rather, it is outside even the asserted source object, DMA controller 31 in combination with microprocessor 24. (Id.; OA at 24)

Separately, even if one were to conclude that Thomason’s CPU 24 acting in combination with DMA 32 met the “transform object” limitation, and it does not, that combined structure still would fail to provide any sort of intelligent management of buffers or manipulation of the video and audio data so as to facilitate the system’s ability to handle asymmetric memory demands **on the output side**. (Second Villasenor Dec. ¶125) As discussed above, Thomason essentially shrugs its shoulders in the event of output buffer shortage. (Second Villasenor Dec. ¶122; Thomason 6:5-12) Thomason is not able, for example, to respond in the event of an asymmetric memory demand on the output side. (Id.) Rather, Thomason teaches directly away from such a system by recommending that in event of an output side memory shortage the buffer should be immediately given to the input irrespective of the impact on the output side data flow. (Second Villasenor Dec. ¶122; Thomason 6:5-12) Accordingly, even if the combination of DMA controller 32 and CPU 24 could otherwise meet the centralized transform object limitation (and it cannot), that combined structure would still fail to provide the recited “automatic flow control” **on the output side**.

In summary, given the well-understood meaning of the term object and the recited centralized transform object architecture, **Thomason plainly fails to meet the claim language for at least the following separate and independent reasons:**

1. Thomason, even as modified by the DMA Embedded Systems Reference, lacks the recited centralized transform object that intelligently manages buffers or the manipulation of the video and audio data so as to facilitate the system's ability to handle asymmetric memory demands of the source and sink objects.
2. One skilled in the art would not have used the asserted synchronous DMA in the Thomason system.
3. Even if such a DMA controller was used in the Thomason system, the ready line assertion would not control the flow but rather be a function of the flow.
4. Moreover, the alleged "ready line" in Thomason is not part of and does not have any interaction with the alleged transform object, DMA controller 32 operating under the supervision of microprocessor 24.
5. Even if Thomason's processor 24 and DMA controller 32 otherwise met the "transform object" limitation, that combined structure would still fail to provide the recited automatic flow control of the sink object on the output side.

The Patent Owner notes that Krause does not remedy any of these defects of Thomason and for that reason the combination, even if made, would still fail to set forth a *prima facie* case of obviousness. Krause lacks the recited centralized transform object that intelligently manages buffers or the manipulation of the video and audio data so as to facilitate the system's ability to handle asymmetric memory demands of the source and sink objects. (Second Villasenor Dec. ¶¶33-34) Krause fails to disclose DMA controllers or other system hardware details and thus fails to teach a system that is adapted for use of the asserted synchronous DMA controller with a "ready line." (Id.) For at least these reasons Krause fails to remedy the above referenced defects in the Thomason system and even in combination with Thomason fails to make a *prima facie* case of obviousness. (Id.)

THE COMBINATION OF THOMASON AND KRAUSE WOULD REQUIRE RE-ARCHITECTING AND WOULD INVOLVE SUBSTANTIAL ADDITIONAL COMPLEXITY AND COST

The Office Action proposes that Thomason should be modified by addition of Krause's I-frame detector. More particularly, the Office states that

[t]he skilled artisan would appreciate that compressor 3 could be an MPEG encoder or, additionally, that a received digital MPEG-formatted broadcast stream could be directly input to buffer 4 without the need for conversion and compression. One of ordinary skill in the art would employ the indexing of detected I-frames, i.e., "parsing," of the MPEG formatted data to identify I-frames from other video and audio data prior to storage in buffer 4.

(OA at 29)² The Office Action is accordingly understood as indicating that Krause's I-frame detector would be inserted in between Thomason's data compressor 3 and buffer 4.

Attempting to combine Thomason and Krause would create numerous technical problems that arise from the architectural incompatibility of the Thomason and Krause systems. First, Thomason's FIFO architecture cannot handle random frame access as would be required to incorporate an I-frame detector such as that taught in Krause. Use of an I-frame detector and the associated index presupposes that the system is able to asynchronously retrieve from the storage device frames at random locations dictated by, for instance, the user's fast forward or reverse function selection. (Second Villasenor Dec. ¶¶26-27; see Krause at 9:65 to 10:21, 11:41-44) The Thomason system, by contrast, is built around a FIFO architecture which is fundamentally incompatible with random frame access. (Id.) The Thomason architecture is not intended to perform, and does not permit, random frame access. (Id.)

Second, the acceleration controller in the combined system cannot interface with an I-frame detector. Thomason does not contain any provision for enabling the "user command

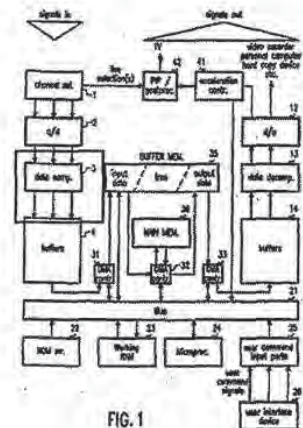


FIG. 1

² Patent Owner notes that the Office has ascribed a different meaning to the term parsing here. "Parsing" does not require "indexing."

signals" identified between boxes 25 and 26 of FIG. 1 to be provided to the acceleration controller. (Second Villasenor Dec. ¶28; First Villasenor Dec. ¶45) There is nothing in the Thomason specification that shows any functional connection between the user interface 26/user command ports 25 and the acceleration controller 41. (Id.) Accordingly, the combined system would be nonfunctional for the additional reason that the acceleration controller is not architecturally configured to receive the requisite commands. (Id.)

While it may be theoretically possible to dissect Thomason and Krause into their discrete component parts and reconstruct them with hindsight in a manner that would provide an operable system, combinations that would require such re-architecting are impermissible. The Manual of Patent Examining procedure provides that

[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.

(MPEP § 2143.01) The Manual continues, explaining that a combination does not establish a *prima facie* case of obviousness if implementing the combination requires "**substantial reconstruction and redesign** of the elements shown in [the primary reference]." (Id., emphasis added)

Here, the combined system would require a complete re-architecting both with respect to the hardware and firmware. (Second Villasenor Dec. ¶¶27-29) Thomason can't be modified to include Krause without changing its fundamental FIFO architecture and re-engineering the entire system from the ground up. (Id.) Accordingly, the combination is impermissible and fails to establish a *prima facie* case of obviousness.

The 2010 KSR Guidelines Update explains that combinations, though technically feasible, may be nonobvious where skilled artisans would not have attempted the combination due to additional effort required to make the combination or the additional complexity thereof:

Even though the components are known, the combining step is technically feasible, and the result is predictable, the claimed invention may nevertheless be nonobvious when the combining step involves such **additional effort that no one of ordinary skill would have undertaken it without a recognized reason to do so**. When a combination invention involves **additional complexity as**

compared with the prior art, the invention may be nonobvious unless an examiner can **articulate a reason for including the added features or steps**. This is so even when the claimed invention could have been readily implemented.

(75 Fed. Reg. 53646, emphasis added) Accordingly, even if the combination could be readily implemented, which is not the case here, there must be reason to combine the references sufficient to overcome the disadvantages associated therewith.

In the instant case there is simply no such motivation because Thomason already has fast forward and reverse functionality and Krause's I-frame detector provides no additional functionality. (Second Villasenor Dec. ¶32) As explained in Thomason, the acceleration controller "controls the acceleration rate at which data is required, including providing for slow motion and frozen frames and frame stepping" and it also "provides for fast forward and fast reverse functions." (Id.; Thomason at 4:19-24) In the Thomason system "[l]ive transmissions and historical transmissions can be simultaneously displayed using PIP (picture-in-picture) techniques by a PIP postprocessor 42." (Id.; Thomason at 4:29-32) Krause's I-frame detector offers no additional functionality. (Id.) Krause's I-frame detector merely enables fast forward, reverse and similar functions that are already performed by the Thomason system. (Id.)

The Office Action posits that the addition of the Krause I-frame detector "would allow Thomason to more efficiently perform operations such as varying speed reverse or varying speed forward by directly retrieving the appropriate I-frames for the selected speed," but in actuality the incorporation of Krause's I-frame detector into Thomason would make those operations substantially less efficient and cumbersome due to the architectural incompatibility of the Thomason and Krause systems. (OA at 21) The combined system would require substantially more memory because the random frame access required to incorporate the I-frame detector retrieves into a buffer large blocks of data from which the needed I-frames are selected. (Second Villasenor Dec. ¶30) Thomason is already an inherently memory intensive architecture and at the time of the invention memory was much more expensive than it is today. (Id.; Thomason 6:5-12) The addition of an I-frame detector would not have been attempted in view of design constraints and parameters **especially at the time of the invention**. (Id.) In a similar vein, the combined system would present much higher disk drive

access demands because I-frames would have to be asynchronously retrieved from the hard drive in response to trick play commands like 10X fast forward and reverse while at the same time capturing all of the data input to Thomason's FIFO data pipeline. (Second Villasenor Dec. ¶31) The hard drive used in such a system would also have to be considerably faster in order to enable I-frame retrieval without input data loss in a system with a commercially reasonable amount of memory. (Id.) For these reasons, and pursuant to the *2010 KSR Guidelines Update*, the claimed subject matter is not rendered obvious by the asserted combination because any advantage associated with the inclusion of Krause's I-frame detector in the Thomason system is far outweighed by the associated disadvantages. (Second Villasenor Dec. ¶32)

The incompatibility of Thomason and then known parser-based systems is evidenced by the fact that the owner of the Thomason patent, Philips Electronics, asked the Patent Owner to design its commercial DVR system and took a license to the '389 patent. Philips filed the Thomason patent application in 1993 and during the 1990s was an active developer of consumer electronics devices. (Second Barton Dec. ¶14) However, even with the Thomason technology they were unable to develop a commercially acceptable DVR. (Id.) In 1998 Philips and TiVo reached an agreement whereby Philips, obtained a license under the '389 patent (then pending), and TiVo designed a commercial DVR sold under the Philip's name. (Id.)

To summarize the reasons why it is inappropriate to combine Thomson and Krause as suggested in the Office Action, attempting the combination would create numerous technical problems that arise from the architectural incompatibility of the Thomason and Krause systems. Although it might have been theoretically possible to dissect Thomason and Krause and reconstruct their component parts into an operable system, such reconstruction is impermissible according to the MPEP. Moreover, any minimal advantage that might be gleaned from the inclusion of Krause's I-frame detector in the Thomason system is far outweighed by the additional cost and complexity. Pursuant to the *2010 KSR Guidelines Update* this militates in favor of a finding that the claimed subject matter is nonobvious. Finally, the fact that the owner of the Thomason patent opted to license the '389 patent instead of further developing the Thomason technology suggests that in actuality those in the industry well

understood that Thomason was architecturally incompatible with the parser-based technology needed to deploy commercially viable DVRs.

THE EXTRAORDINARY COMMERCIAL SUCCESS RESULTED DIRECTLY FROM THE CLAIMED CENTRALIZED TRANSFORM OBJECT ARCHITECTURE

Because the Office Action indicates that the Examiner “generally agrees that TiVo products were indeed successful as opined in the Barton Declaration,” (OA at 12) only a brief recap of the invention’s commercial success is necessary here. TiVo estimates that it, its licensed partners, and EchoStar (an adjudged infringer of the ‘389 patent) have sold at least 20,000,000 licensed or infringing DVRs. (Second Barton Dec. ¶18) SI Vault magazine called the TiVo DVR, which has always included the centralized transform object architecture, the “greatest invention, period.” (First Barton Dec. ¶11) The TiVo DVR was awarded several Technology and Engineering Emmy awards. (First Barton Dec. ¶18) USA Today selected the TiVo DVR as one of the “Top 25 Inventions That Changed Our Lives.” (Id.) Other commentators correctly noted that “TiVo singlehandedly created the market for digital television recorders.” (First Barton Dec. at Exhibit 7)

The TiVo product created the market for DVRs because it was the first commercially viable product that could manipulate a live television broadcast (Second Barton Dec. ¶19) VCRs, then prolific, could not do so. (Id.)

The TiVo solution was commercially viable for at least the following two important reasons: the **smoothness of the video control** and the **retail cost of the system**. **Both of these attributes derive directly from the recited transform object architecture and automatic flow control.**

The quality of the TiVo DVR’s “live TV” control was substantailly enhanced by the existence of a transform object that was intelligent enough to control the flow in a manner that accommodates the additional memory needs and access requirements created by activation of trick play functions, while also minimizing loss of data on the input side. (Second Barton Dec. ¶¶10-13) When performing a trick play function such as fast rewind, for example, the system must quickly find the appropriate data and output it in the sequence demanded by the user.

The retrieval must be fast and precise. Without a transform object automatically controlling the flow, trick play operations would be visibly uneven, or choppy. (Id.) For example, to provide a smooth rewind operation, there must be an adequate cache of I-frames in the output buffer. (Id.) Similarly, on the input side, the system must be able to, among other things, control the flow of highly variable incoming data. Otherwise data could be lost or compromised. Without a transform object controlling the flow for both the input and output buffers, under certain conditions the system would not be satisfying to the user. (Id.) Accordingly, the recited centralized transform object architecture and automatic flow control provided the smooth control of live TV that was critical to the success of the TiVo DVR. (Id.)

Several major consumer electronics companies indicated that they believed that the smoothness of the TiVo trick play functionality was particularly attractive to customers. TiVo was asked to, and did, design DVRs for Toshiba, Pioneer and DIRECTV. (Second Barton Dec. ¶¶15-16) During negotiations of the underlying agreements, each one of these entities made repeated statements to the effect that the TiVo DVR's smooth trick play functions were highly attractive to customers. (Id.)

With respect to the cost of creating a commercially viable DVR, given that memory was relatively expensive in the late 1990s there was strong motivation to use DRAM to provide both an input buffer and output buffer for a hard disk drive. (Second Barton Dec. ¶¶10-13) DRAM was on the order of 100X more expensive at the time of the invention in 1998 than it is today. (See, e.g., <http://aqigatech.com/blog/page/2/>) The memory chips were single port devices such that writing and reading routines cannot be performed at the same time. (Id.) The intelligent centralized transform object was the key technology that enabled cost-effective use of DRAM. (Id.) Thus, the intelligent centralized transform object architecture enabled at least in substantial part the delivery of an effective DVR product at a commercially viable price. (Id.)

There accordingly exists a strong nexus between the extraordinary commercial success of the TiVo product and the recited centralized transform object architecture. Without the **recited centralized transform object architecture** the commercial systems would not have provided **smooth trick play** and would not have been **manufacturable at a commercially viable**

price point. Both of these attributes contributed directly and substantially to the extraordinary commercial success of the TiVo DVR product. (Second Barton Dec. ¶¶12-13)

THE NONOBVIOUSNESS OF THE CLAIMED INVENTION IS DEMONSTRATED BY SUCCESSFUL LITIGATION, LICENSING, LONG-FELT NEED, AND FAILURE OF OTHERS

Secondary or objective evidence is often the most probative evidence on the question of obviousness including because it is perhaps the best safeguard against the temptation to engage in theoretical combinations of references that those in the industry would not in fact attempt. The Federal Circuit recently noted that “[o]ur case law is clear that this type of evidence ‘must be considered in evaluating the obviousness of a claimed invention.’” *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 2010 U.S. App. LEXIS 17181 at *14-*15, ___ F.3d ___ (Fed. Cir. August 18, 2010) And it has long been established that “evidence of secondary considerations may often be the **most probative and cogent evidence** in the record.” *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983) (emphasis added)

Here the record shows that virtually all possible objective factors indicate that the market and the industry universally considered the claimed subject matter to be nonobvious: praise of the patent, acquiescence, successful litigation, long-felt need, and failure of others. MPEP 716.01(a) First, the invention of the ‘389 patent was specifically identified by the USPTO for inclusion in the USPTO Museum. (First Barton Dec. ¶10) A contemporaneous article relayed the story as follows:

Joining the esteemed ranks of inventions such as the toothbrush, seat belt, computer and alarm clock, several TiVo inventions are featured in a new year-long exhibit at the United States Patent and Trademark Office (USPTO) Museum in Alexandria, Va., beginning July 13[, 2005] . . . Depicted in a three-dimensional virtual diorama, the TiVo display showcases a living room decorated with TiVo trademarked logos and icons on everything from rugs to wall decor. Set to upbeat music, a video loop displayed on a TV on the "living room" wall highlights the benefits of **TiVo's Time Warp patent (U.S. Patent No. 6,233,389)**, which covers TiVo's proprietary technology for efficiently storing and playing back TV shows.

(First Barton Dec. ¶10, Ex. 15) During due diligence investigations various investors likewise praised the '389 patent and indicated that they believed the '389 patent to be particularly valuable. (Second Barton Dec. ¶17)

Numerous companies, including many leading developers of consumer electronics, licensed the claimed subject matter and asked TiVo to build their DVR products. (First Barton Dec. ¶13) Among the licensees were Philips, Sony, Toshiba, Pioneer, Comcast, DirecTV, AT&T Broadband and Earthlink.³ (Id.) Additional licenses have been granted and still others are in process. (Second Barton Dec. ¶17) Many of the licensees additionally asked TiVo to design their commercial DVR products in recognition of the superiority of the TiVo architecture. (Second Barton Dec. ¶¶14-16)

On a related note, many companies made sizeable investments in TiVo based substantially and specifically on the strength of the '389 patent. Over \$500,000,000.00 was invested collectively by AOL, NBC, HBO, ShowTime, Discovery, and others. (Second Barton Dec. ¶17) A substantial motivation for many of these investments, in addition to the flexibility of the TiVo system architecture, was the strength of TiVo's intellectual property, especially and in particular the '389 patent. (Id.)

The '389 patent has also been litigated and found not to be invalid. EchoStar mounted a full scale assault on the validity of the '389 patent in the case captioned *TiVo Inc. v. EchoStar Communications Corp., et al.*, Case No. 2-04cv01DF (E.D. Tx.). In that case the District Court upheld the validity of the '389 patent (and indeed the very two claims at issue in this reexamination) and the Federal Circuit affirmed. *TiVo Inc. v. EchoStar Comm.*, 516 F.3d 1290 (Fed.Cir. 2008). Moreover, the District Court has awarded TiVo more than \$400 million to date in connection with EchoStar's infringement of Claims 31 and 61 of the '389 patent, recognizing at least in part the value of the claimed subject matter.

A recent BPAI decision involving secondary considerations is instructive because its fact pattern bears so much resemblance to the instant case. In *Ex Parte Technofirst S.A.*, 2010 WL 785243 (BPAI March 5, 2010), the Board considered whether a finding of obviousness in a

³ TiVo granted several of these parties covenants not to sue, which are equivalent to patent licenses. *Transcore LP v. Elec. Trans. Consultants Corp.*, 563 F.3d 1271 (Fed. Cir. 2008)

reexamination proceeding was overcome by objective evidence of nonobviousness. The Board held (emphasis added):

The fact that the patent has been **litigated**, not found to be invalid or unenforceable, and had parties take **licenses** thereto is indicative that Appellant's invention is not obvious. As such, we find this evidence to be **compelling with respect to obviousness** of the independent claims.

That is precisely the case here. The '389 patent has been litigated and many parties, including leading consumer electronics companies, have taken licenses. This is compelling evidence because various judges, jurors, and companies have agreed that the subject matter recited in the claims under reexamination is innovative and nonobvious.

The record also shows that the '389 patent met a long-felt need that many others in the industry tried but failed to address. No previous commercially available product could rewind a live television broadcast or simultaneously pause and record live TV. (Second Barton Dec. ¶19) TiVo was the first DVR product on the market, and it was successful precisely because its centralized transform object architecture enabled the system to do what others failed to do: provide an "easy-to-use" solution that "improves the way people enjoy television by offering the capability to pause, rewind, create slow motion and even replay live TV instantly." (First Barton Dec. ¶19; PR Newswire October 17, 2006; Second Barton Dec. ¶19)

The secondary considerations evidence is at least as compelling here as it was in the *Technofirst* case. The '389 patent was selected for inclusion in the USPTO Museum. The '389 patent has been licensed by numerous leading consumer electronics companies (Sony, Philips, Toshiba, Pioneer, etc.) as well as the leading US cable and satellite operators (Comcast, DIRECTV, etc.). The '389 patent was adjudged not invalid by the courts in the EchoStar case. Over half a billion dollars has been invested in TiVo based substantially on the strength of the '389 patent.

The foregoing evidence demonstrates that the market, the industry, and the courts have considered the subject matter claimed in the '389 patent to be innovative and nonobvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530 (Fed. Cir. 1983) It is respectfully submitted that this objective evidence is an important safeguard against the temptation to engage in

theoretical combinations of references that those in the industry would not have attempted and which Philips (the owner of Thomason) in fact did not attempt.

INTERVIEW SUMMARY

The Patent Owner thanks Examiners Ferris, Keasel and Kiss for the courtesies extended during the interview conducted on August 25, 2010. During the interview the Patent Owner conveyed the arguments delineated in the slide deck entitled "US 6,233,389 to Barton et al. Multimedia Time Warping System, Examiner Interview, 90/009,329" which is being submitted via an information disclosure statement on even date herewith. That slide deck was shown during the interview and Mr. Barton, Prof. Villasenor, and the undersigned presented the positions set forth therein.

NEW DECLARATION EVIDENCE

The Second Barton Declaration and the Second Villasenor Declaration are submitted pursuant to 37 CFR 1.116(e) which provides that such declaration evidence "may be admitted upon a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented." The declarations are offered to address issues specifically presented for the first time in the Final Office Action. More particularly, the declarations address the position set forth in the Office Action that one skilled in the art would understand that synchronous DMA "ready line" as used in the Thomason system would satisfy the centralized transform object architecture. (OA at 5) The declarations are also offered to address the finding in the Office Action that the previous declarations were insufficient to establish a clear nexus between the merits of the claimed invention and the proposed evidence of commercial success. (OA at 12) The declarations further address the "re-architecting" issue in response to the finding in the Office Action concerning the sufficiency of the showing relating to how the combination would change the principle of operation of Thomason. (OA at 10-11) The Patent Owner respectfully submits that the foregoing constitutes good and sufficient reason why the declaration evidence was not earlier presented and hereby requests entry of the Second Barton Declaration and the Second Villasenor Declaration.

CONCLUSION

For the foregoing reasons the Patent Owner respectfully requests confirmation of the claims under reexamination.

The absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper.

The Director is authorized to charge any fees or credit any overpayments to Deposit Account No. 09-0946.

Respectfully submitted,

Dated: September 9, 2010

/Greg H. Gardella/
Greg H. Gardella
Reg. No. 46,045

Irell & Manella LLP
1800 Avenue of the Stars
Suite 900
Los Angeles, CA 90067-4276
310.203.7915

CERTIFICATE OF SERVICE

I hereby certify that on September 9, 2010 I caused a true and correct copy of the foregoing Response to Office Action, Declaration of John D. Villasenor, Declaration of James M. Barton, Information Disclosure Statement (SB08) and Non-Patent Literature, Revocation of Power of Attorney and New Power of Attorney, and Statement Under 37 CFR 3.73(b) to be served via First Class U.S. Mail on the following:

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

Date: September 9, 2010

/Greg H. Gardella/
Greg H. Gardella
Reg. No. 46045

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Barton et al.
U.S. Patent No.: 6,233,389
Issue Date: May 15, 2001
Serial No.: 09/126,071
Filing Date: July 30, 1998
Reexam Control No.: 90/009,329
Title: MULTIMEDIA TIME WARPING SYSTEM

SECOND DECLARATION UNDER RULE 1.132 OF JAMES M. BARTON

I, James M. Barton, declare as follows:

1. I understand that I am submitting a declaration in connection with the above-reference reexamination proceeding pending in the United States Patent and Trademark Office for U.S. Pat. 6,233,389 ("the '389 patent"). I am a co-inventor of the '389 patent.
2. I hold a Bachelors of Science degree in Electrical Engineering and a Masters of Science Degree in Computer Science from the University of Colorado at Boulder. I have worked in the electronics industry for over 30 years. I was an engineer at Bell Laboratories and an engineering manager at Hewlett Packard and Silicon Graphics.
3. Thirteen years ago I co-founded TiVo. I am presently the Chief Technology Officer ("CTO") and Senior Vice President of Research and Development for TiVo, the owner of the '389 patent. I have first hand knowledge of product development, marketing, product deployment, business relationships with third parties, and other various business matters of TiVo from its inception to the present.
4. I am an inventor on well over 100 U.S. and international patents and applications in the area of software and electronics.
5. I previously presented a declaration in this reexamination proceeding in support of patent owner TiVo's response filed November 2, 2009. I present the following declaration in support of TiVo's response to the final office action, where claims 31 and 61 are rejected. The declaration is intended to provide information concerning issues that were discussed at the August 25, 2010 examiner interview, which I attended.

6. TiVo introduced a digital video recorder ("DVR") product in early 1999 that included all of the limitations recited in claims 31 and 61. TiVo has introduced into the market other DVR products subsequent to the initial product launch. Every TiVo DVR product sold in the market embodies and practices claims 31 and 61 of the '389 patent.

7. TiVo has licensed the '389 patent to 13 different third party entities and continues to discuss licenses with other parties. The licensed entities include Philips, Sony, Toshiba, Pioneer, Comcast, DirecTV, RCN, Suddenlink, AT&T Broadband, Earthlink, Windstream, TGC and Humax.

8. To date TiVo has sold roughly 4,000,000 DVRs. Based on my knowledge of the market I estimate that TiVo's partners have provided roughly 14,000,000 DVRs that embody and practice claims 31 and 61 of the '389 patent. Furthermore, EchoStar has been found to infringe claims 31 and 61 of the '389 patent. EchoStar has sold at least several million infringing DVRs.

9. All of the TiVo DVRs include "trick play" functions that, among other things, allow a user to rewind, fast forward and pause video/audio content streamed into a box. TiVo's DVRs were the first commercial products to include trick play functions that could for instance rewind a live television broadcast. The ability to rewind, pause and otherwise manipulate a live television broadcast revolutionized the television industry. No other available product commercially available at the time could do so. For example, conventional VCRs could not rewind a live broadcast.

10. To enhance market acceptance of such a pioneering product, TiVo's DVRs had to be sold at a price that was commercially acceptable to the consumer. To minimize cost, TiVo DVRs originally included a DRAM that provided both an input buffer and output buffer for a hard disk drive. The DRAM used in the TiVo DVR products has been a single port device such that writing and reading routines cannot be performed at the same time.

11. Constructing a DVR to include a transform object that automatically flow controls a source object and a sink object was essential to creating the trick play functions in a commercially viable product. Video, for example, is stored on the hard disk drive in MPEG

format. MPEG format includes I, B and P frames. I frames are usually significantly larger than B and P frames. In normal operation, the I, B and P frames are retrieved from the disk drive and stored in the buffer (e.g. DRAM). When performing certain trick play functions such as fast rewind, the drive only retrieves I frames. Because I frames are larger than B and P frames more output buffer space is required. Additionally, more access time for the DRAM and the disk drive is required to retrieve this larger amount of data. Because the DRAM chips have usually been single ported and have historically provided both the input and output buffers in the TiVo DVRs, there has been a need to provide a transform object that controls the flow of data into and out of the DRAMs. The transform object has to be intelligent enough to control this flow.

12. Without a transform object automatically controlling the flow into the DRAM in these TiVo DVRs, trick play operations would have been visibly uneven, or choppy. For example, to provide a smooth rewind operation, especially in single-port DRAM DVRs, there generally has to be an intelligent management of the buffers or data handling or else the output will at least periodically be starved of the required frames.

13. The transform object architecture and automatic flow control was critical to the provision of the smooth control of live TV which drove the sales of the TiVo DVR products.

14. The face of the Thomason patent indicates that it was assigned to Philips. Philips was one of the world's largest consumer electronics companies and sold products such as VCRs. During the 1990s Philips was an active in the design and development of consumer electronics devices. However, to my knowledge they did not develop a commercially viable DVR on their own. In 1998 Philips and TiVo agreed to develop a DVR to be sold under the Philips name. A photo showing the TiVo designed Philips DVR is attached as Exhibit A. The Philips DVR embodied and practiced claims 31 and 61 of the '389 patent.

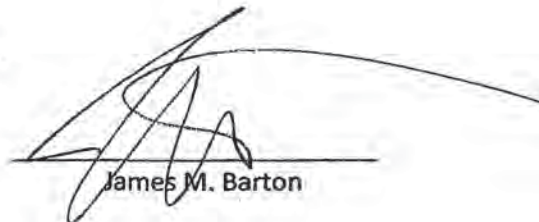
15. TiVo also designed DVR products for Sony Electronics, including a satellite receiver box for DIRECTV and a box sold under the Sony name. A photo of the Sony box is attached as Exhibit B. The Sony DVRs embodied and practiced claims 31 and 61 of the '389 patent.

16. TiVo also designed DVRs that were sold by Toshiba, Pioneer and DIRECTV. Each one of these DVRs embodied and practiced claims 31 and 61 of the '389 patent. During negotiations for the agreements with TiVo, each one of these entities made repeated statements as to the customer attractiveness of the trick play functions and the smooth manner in which the TiVo DVRs performed these functions.

17. TiVo received over \$500,000,000.00 in investments from third party entities such as AOL, NBC, HBO, ShowTime, Discovery, Sony and Philips. A Philips employee was also a board member of TiVo. AOL invested \$200,000,000.00 in TiVo and requested that TiVo design a DVR for them. These entities performed technical due diligence before investing in TiVo. All of these entities were enthusiastic about the customer attractiveness of the trick play functions and the smooth and reliable way in which the TiVo DVRs performed these functions. These entities also expressed that TiVo's intellectual property, including the '389 patent, was considered to be an important corporate asset.

18. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Executed on September 9, 2010 at Alviso, California.



James M. Barton

EXHIBIT A

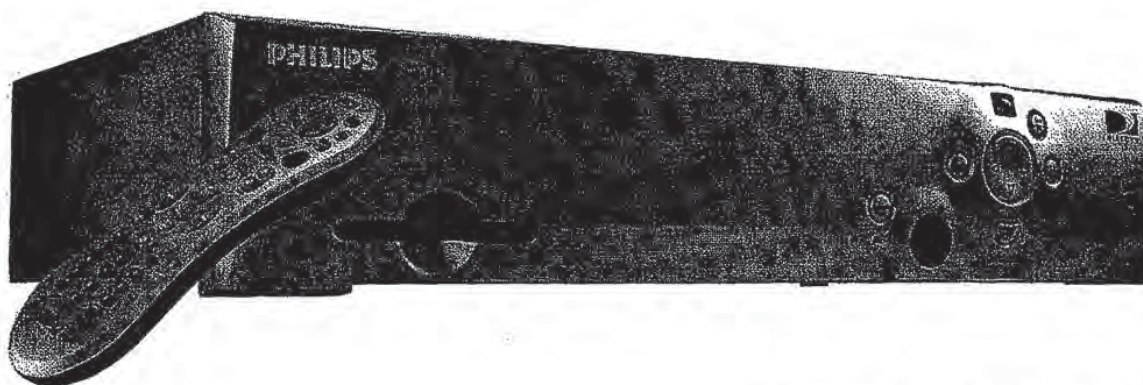
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DIRECTV® DVR powered by TiVo®

DSR 7000

Receive and record your favorite programs with ease

- **Combine access** to over 225 digital-quality channels of DIRECTV® programming with the convenience and control of the DIRECTV Digital Video Recorder.
- **Digitally record** up to 35 hours* of DIRECTV® programming to watch whenever you're ready.
- **Dual Tuners** allow you to record two shows at the same time or watch one while recording another.**
- **Use Season Pass™** to automatically record every episode of your favorite shows.
- **Use WishList™** to find and record programs that match your interests.
- **DIRECTV Advanced Program Guide™** for access to up to 14 days of program listings.



PHILIPS

Digital Video Recorder



DSR7000

Technical Specifications

Satellite In:	F-type connector - female(2)
Video Decoding:	MPEG-2, 4:3 and 16:9 video format
Video Out:	S-Video 4-pin mini DIN, Composite Video RCA (2), F-type connector - female
Audio Decoding:	MPEG-1 layer II
Audio Out:	Stereo L/R RCA (2-pairs), Optical SPDIF Digital
RF In:	F-type connector - female
RF Out:	F-type connector - female, Channel 3 or 4 switchable
Telephone:	RJ-11 female, 2-wire
Control Out:	3.5mm mini jack sockets (2)
Card Slot:	Access card for service
Power:	120V, 60Hz, 40W
Operating Temperature:	5 C to 45 C
Operating Humidity:	5% to 80%
Dimensions:	15in.W x 12in.D x 3in.H
Weight:	11.4 lbs.
Remote Control:	37 button (two AA batteries included)
Accessories Port:	Two USB 2.0 ports
Optional Accessories:	DIRECTV 18" dual - LNB satellite dish, DIRECTV PLUS™ oval satellite dish, DIRECTV phase III multi-satellite antenna

Packaged with required accessories

UPC 0 37849 93827 0

For more information about Philips satellite products and accessories, please contact:

Philips Digital Video/Set Top Boxes

64 Perimeter Center East

Atlanta, GA 30346

Telephone: (770) 821-2400

www.philips.com or AOL keyword: philips

DIRECTV programming is sold separately and independently of DIRECTV System hardware. A valid programming subscription is required to operate DIRECTV System hardware. Please contact DIRECTV directly at 1-800-DIRECTV to order programming. TiVo service subscription required for complete feature functionality. DIRECTV, and DIRECTV PLUS are trademarks of DIRECTV, Inc. a unit of Hughes Electronics Corp., and are used with permission. Dolby Digital and Dolby ProLogic are trademarks of Dolby Laboratories Philips and the Philips logo are trademarks of Philips Electronics North America. TiVo, the TiVo logo and related exclusive services are trademarks of TiVo Inc. All rights reserved. Subject to change without notice. Printed in the USA. DIRECTV and the Cydone Design logo are trademarks of DIRECTV, Inc., a unit of Hughes Electronics Corp., and are used with permission.

*Actual recording capacity depends on type of programming being recorded.

Specifications are subject to change without notice.

**For full functionality, this recorder requires connection of two (2) satellite inputs from dual LNB DIRECTV system dish antenna.

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Features At A Glance

Combine access to over 225 digital-quality channels of DIRECTV® programming with the convenience and control of digital video recording.

Control Live TV

Pause, rewind, slow motion or instant replay live TV anytime.

Season Pass™

Use Season Pass to automatically record every episode of your favorite shows every time they air – even if the date and time slot change.

WishList™

WishList will find and record DIRECTV® programming based on your favorite actors, directors, teams, or interests.

Movies and Events

Access up to 31 premium movie channels and as many as 60 pay-per-view movie choices per month.

Sports

Access to major professional and college sports subscriptions including NFL, NBA, MLB, NHL, WNBA, MLS, and NCAA.

40GB Hard Disk

35 hours* of digital recording of your favorite DIRECTV® programming allows you to watch TV on your schedule.

Dual Tuners

Allows you to record two shows at the same time or watch one while recording another.**

Advanced Program Guide™

Enables you to browse upcoming programs and events 14 days before they air.

Surround Sound

Dolby Digital™ 5.1, Dolby ProLogic, and stereo audio for live and recorded shows.

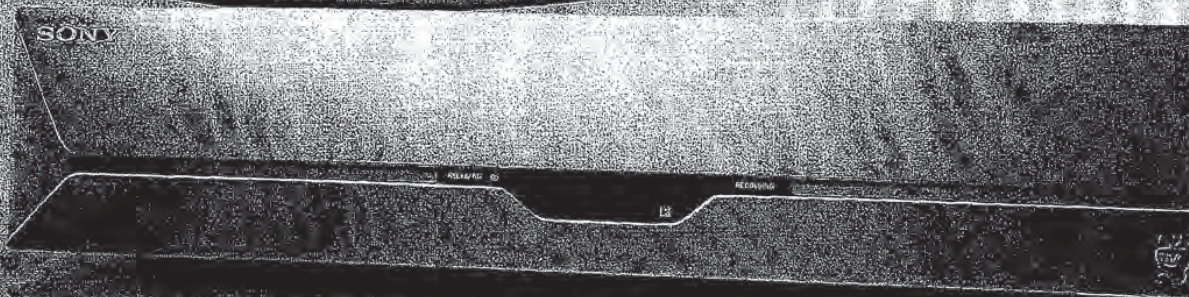
Software Upgrades

Updates automatically performed to continually offer current enhancements when they become available.

EXHIBIT B

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SONY



2001 HOME NETWORK PRODUCTS
SVR-2000 DIGITAL NETWORK RECORDER

MAKING SENSE OF
A 500-CHANNEL
WORLD TAKES
POWERFUL
INTELLIGENCE.

Imagine coming home from work and turning on your television. Instead of surfing through all those channels, looking in vain for something you might like, imagine accessing a menu of your favorite TV shows already recorded for your convenience! That's the magic of the Sony

SVR-2000 Digital Network Recorder with TiVo™ Service. It's the foolproof way to manage and enjoy the hundreds of channels in today's TV landscape. Now you can enjoy the very best that television has to offer, every single time you turn it on!

NOW THERE'S ALWAYS SOMETHING GOOD ON TELEVISION. Sony's first home VCR sparked a revolution – giving ordinary viewers their first measure of control over the TV schedule. People could record shows for later viewing or even watch one show while they recorded another. Now Sony unleashes the next generation. The Sony SVR-2000 Digital Network Recorder with TiVo® Service uses tapeless digital recording to personalize your TV schedule.

• **TiVo's Suggestions.** The SVR-2000 is constantly thinking, seriously, of ways to make the TV experience simpler, more convenient and above all more enjoyable. You can rate your favorite TV shows with up to three Thumbs Up[®] and tag your least favorite shows with up to three Thumbs Down[®]. The SVR-2000 then uses your ratings to automatically find and record shows similar to your favorites! These shows appear on the Now Playing list, your personal menu of recorded programs.

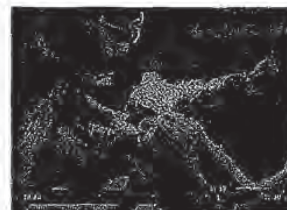
• **Season PassSM service.** Tell TiVo once and it will automatically find and record every episode of your favorite show, every time it airs — even if the television network lineup changes! You'll never need to surf through channels, looking for something to watch. Just go straight to your favorites!

- **Wish List.** Select your favorite actors, directors and keywords and the SVR-2000 can display every upcoming show that matches your choices. Want to record them all? Just touch a button and it's done!

• **Now Playing List.** Just press the LIST button to see an easy on-screen menu of your recorded shows. You simply move down the menu to the show that you want to watch and press a button. Bingo! Instant access.

CONTROL LIVE TELEVISION. The SVR-2000 automatically stores up to 30 minutes of the TV shows you've been watching – a feature that leads to a host of useful options.

- **Pause live television.** Never again miss out because of a phone call. Simply press Pause and the SVR-2000 continues recording. When you return, you can pick up where you left off at the touch of a button.

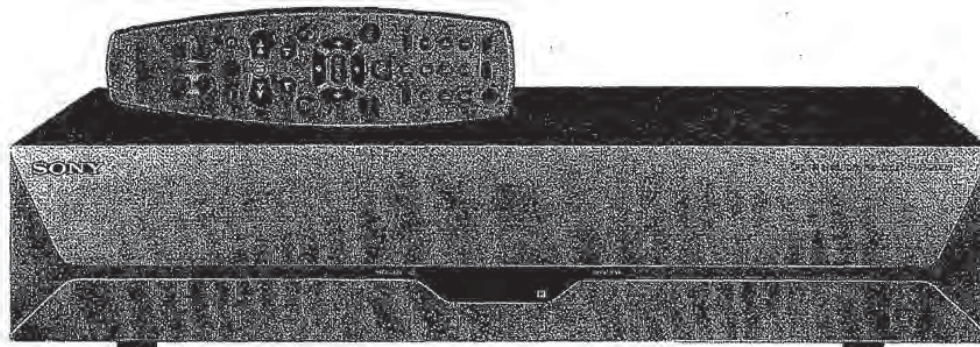


• **Instant replays.** They're perfect for sports or lines of dialog that you missed. The SVR-2000 enables you to pause, rewind, enjoy frame-by-frame slow motion and create your own instant replays.

- **"Catch up" to live TV.** After your instant replay, use the **Advance** button to return to the live broadcast.

**RECORD UP TO 30 HOURS WITHOUT
VIDEOTAPE.¹** The SVR-2000 captures television
picture and sound on a built-in hard disk
drive — an arrangement that means high
quality and superb convenience.





- **Digital quality.** You'll see high-quality MPEG-2 digital video. You'll hear spectacular digital audio.
- **Selectable quality.** The SVR-2000 lets you choose the recording quality to suit your programming needs. Choose Basic (recommended for cartoons and news), Medium (for sitcoms and soaps), High (for dramas and movies) and Best Quality (for sports and action).
- **Instant access.** With hard disk recording, you'll never need to fast-forward or rewind to your show, the way you do with videotape. All your recorded shows are available in an instant! And you can use the Advance button to jump instantly to the end of a recorded show.
- **High-speed search.** The SVR-2000 offers forward and reverse search at 3x, 18x and 60x speeds. (At 60x, you can zip through an entire hour of programming in just one minute.)
- **Record one show while you play back another.** The SVR-2000 can simultaneously record and play! For example, during the recording process, you can start watching the show you're recording from the beginning. Or watch any other program already recorded on the SVR-2000.

YOUR COMPLETE GUIDE TO TELEVISION.

The TiVo Service has complete listings for over 13,000 cable systems, most direct broadcast satellite systems (DIRECTV®, Primestar and Dish Network/EchoStar) and over-the-air TV broadcasting. For your convenience, the SVR-2000 includes a built-in modem. Once a day, your SVR-2000 automatically calls in to the TiVo computer to update its 14-day program guide and to upgrade your SVR-2000 with new features and content. So you're always up-to-date!

- **TiVo programming guide.** Updated daily, this on-screen programming grid includes 14 days of listings. You can search for shows by name, channel and time. And you can schedule automatic recordings straight from the guide.
- **TiVoMatic™ recording.** When a network advertises a show that looks good and the TiVoMatic icon is displayed, you can automatically record the show by touching a button. For example, if you're watching NBC news, you see an ad for Dateline NBC and you see the TiVoMatic icon, you can record the show automatically!
- **Network Showcases.** This TiVo feature lists some of the best TV programs from some of the biggest TV networks. You can record any of the shows with a single touch of a button.

- **TiVoolution™ Magazine.** This editorial guide keeps you current on noteworthy specials, movies and television events.

- **TiVo Takes™.** This exclusive preview show highlights the best in upcoming entertainment, where available.² When you see a preview you like, you can record the show by simply touching a button.

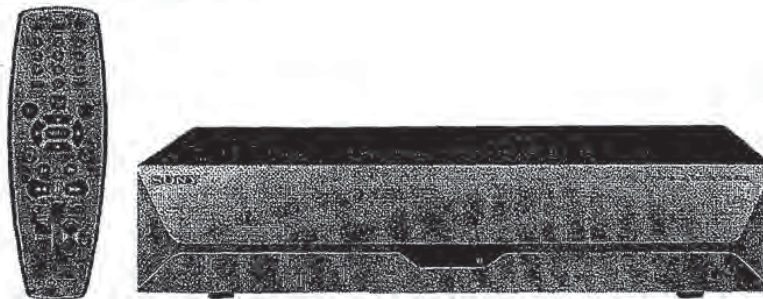
THE BEST FRIEND YOUR VCR EVER HAD. Even a tapeless digital recorder can still work seamlessly with your Sony VCR! Auto VCR Transfer makes it easy to transfer any recorded show from the SVR-2000 to a Sony VCR. So you can save shows for later viewing – while you save space on the hard disk drive.

SUBSCRIBING TO THE TIVO SERVICE.

The Sony SVR-2000 works exclusively with the TiVo Personal TV Service³. You can subscribe to the service for either \$9.95 per month or a one-time fee of \$249 for the life of the SVR-2000. You can activate the TiVo service by calling 1-877-367-8486 (1-877-For-TiVo) or going to www.tivo.com/activate.

SVR-2000 DIGITAL NETWORK RECORDER WITH THE TiVo SERVICE

- Tapeless digital recording
- Pause live television; automatically saves up to the last 30 minutes of TV you've watched
- Perform your own slow motion and instant replay
- Records up to 30 hours of television¹
- Simultaneous record and playback from hard disk drive
- High speed picture search at 3x, 18x and 60x normal speed in forward and reverse
- Frame-by-frame advance in forward and reverse
- Status Bar shows where you are in a recorded program
- Season Pass[™] function records every episode of a show
- TiVo's Suggestions finds and records shows similar to your favorites
- Wish List finds upcoming shows with your favorite actors, directors or keywords
- TiVo Takes preview show, where available²
- TiVoMatic[™] recording
- Network Showcases
- TiVo Live TV guide provides listings for 14 days of shows
- Multi-brand remote also operates key functions on many brands of TVs and A/V receivers³
- Two sets of A/V outputs
- S-Video output
- RF Input for cable or local antenna
- Future software upgrade capability
- Stylish silver design



SVR-2000

SPECIFICATIONS

Video line input	S-Video 4 pin mini DIN (1) Composite video phono jack (1)
Video line outputs	S-Video 4 pin mini DIN (1) Composite video phono jack (2)
Audio line input	Stereo L/R phono jacks (1 pair)
Audio line outputs	Stereo L/R phono jacks (2 pairs)
RF input	F type female (1)
RF output	F type female (1)
Telephone interface	RJ-11 female 2-wire (1)
Control outputs	3.5 mm Mini jacks (2)
Hard disk capacity	30 GB
Recording time	30 hours at Basic Quality 19 hours at Medium Quality 14 hours at High Quality 9 hours at Best Quality
Power requirements	120 V AC, 60 Hz
Power consumption, max	40 w
Dimensions (W x H x D)	17 x 3-7/8 x 11-1/2" (430 x 97 x 290.5 mm)
Weight	9 lbs., 1 oz. (4.1 kg)
Supplied accessories	Remote control (1) Size AA batteries (2) AC power cord RF coaxial cable Audio/Video cables (2) Infrared control cable with two Infrared blasters (1) Serial control cable (1) Serial adapter (1) S-Video cable (1) Phone cord (1) Phone splitter (1)

FRAME-BY-FRAME ADVANCE. Enables you to study sports plays in forward and reverse.

FUTURE SOFTWARE UPGRADE CAPABILITY. Enables future refinements, by accepting new versions of the operating software automatically as part of the TiVo Service.

HIGH-SPEED SEARCH. Forward and reverse search at 3x, 18x and 60x speeds. At 60x, you can zip through an entire hour of programming in just one minute.

INSTANT REPLAY. Automatically replays the last eight seconds of live TV at the touch of a button.

MULTI-BRAND REMOTE CONTROL. Simplifies operation by also controlling key functions on many brands of TVs and A/V receivers.¹

NETWORK SHOWCASES. Highlight listings for some of the biggest shows from some of the biggest networks – just for TiVo subscribers.

PAUSE LIVE TELEVISION. The digital hard disk recorder holds up to 30 minutes² of the shows you've been watching, which enables you to pause live television, answer the phone and then return to a show where you left off.

RF INPUT. Accommodates a broadcast TV antenna or cable.

SEASON PASS RECORDING. Automatically finds and records every episode of your favorite show, every time it airs.

SIMULTANEOUS RECORD AND PLAYBACK. Enables you to watch a show from the hard drive – even while you're recording a new show!

STATUS BAR. On-screen bar across the bottom of the picture that shows where in the recorded program you are. For recording of live TV, the Status Bar shows where you are in relation to the start and end time of the live show.

S-VIDEO OUTPUT. Achieves high resolution, crisp picture edges and clear color.

TAPELESS RECORDING. The SVR-2000 records up to 30 hours of programming onto a built-in hard disk drive.³

TIVO PROGRAMMING GUIDE. Includes 14 days of listings. You can schedule automatic recordings directly from the guide.

TIVO SERVICE. Subscription service that includes a special 14-day program guide updated daily, the ability to rate your favorite programs to find others that match your interests, exclusive daily updates on what's current on television, plus the ability to pause live television and schedule shows for automatic digital recording.

TIVO'S SUGGESTIONS. Automatically records shows similar to the ones you like, as indicated by your Thumbs Up/Thumbs Down rating.

TIVO TAKES.⁴ Where available, this exclusive show, just for TiVo subscribers delivers highlights from upcoming shows and TiVoMatic previews.

TIVOMATIC RECORDING. When a network advertises a show that looks good, you can automatically record it by touching a button. (Requires compatible network previews.)

TWO SETS OF A/V OUTPUTS. One for your television. One for your A/V receiver.

WISHLIST.⁵ Enables you to find programs based on your favorite actors, directors and keywords. Displays and records all upcoming shows that match your criteria.

¹ Actual recording capacity depends on programming recorded.

² TiVo Takes: Coming Soon. May not be available in all areas.

³ Multi-brand remote: May not operate some brands or models.

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SONY

Sony Electronics Inc.
1 Sony Drive, Park Ridge, NJ 07656
www.sony.com

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Barton et al.
U.S. Patent No.: 6,233,389
Issue Date: May 15, 2001
Serial No.: 09/126,071
Filing Date: July 30, 1998
Reexam Control No.: 90/009,329
Title: MULTIMEDIA TIME WARPING SYSTEM

SECOND DECLARATION UNDER RULE 1.132 OF DR. JOHN D. VILLASENOR

I, John D. Villaseñor, declare as follows:

1. I received my PhD from Stanford University in 1989. From 1997-2002, I was vice chairman of the Electrical Engineering Department at University of California, Los Angeles. I am currently a professor of electrical engineering at UCLA.

2. My research has been featured on the cover of *Scientific American* magazine and in numerous technical journals. I am an inventor on approximately 19 issued patents and have over 100 peer reviewed journal articles and conference proceedings.

3. I previously presented a declaration in this reexamination proceeding in support of patent owner TiVo's response filed November 2, 2009. I present the following declaration in support of TiVo's response to the final office action, where claims 31 and 61 are under reexamination. This declaration is intended to provide information and opinions concerning issues that were discussed at the August 25, 2010 examiner interview, which I attended.

4. As was discussed at the interview, the claims at issue here focus on an architecture in which there is what the claims refer to as a "transform object." This transform object occupies what can be characterized as a central position within the recited architecture. The claims at issue recite that this transform object automatically flow controls the source object (located on the input side) and the sink object (located on the output side).

5. One of skill in the art would understand that the recited centralized transform object intelligently manages buffers or the manipulation of the video so as to facilitate the system's ability to handle asymmetric memory demands of the source and sink objects.

6. According to the recitations of claims 31 and 61, there is a flow of data through the system of the claims at issue. The data comes in from the physical source, passing through a disk drive or similar storage (where the data may stay for some time), and then flowing from the disk drive to a display (for example, a television monitor). One

could think of the flow as being subdivided into two pieces, the first being the flow from the physical source onto the disk drive and the second being the flow from the disk drive to the display.

7. The flow of data is automatically controlled by the transform object, as recited in the claims. The specification states (column 8, lines 48-49) that this automatic flow control manifests itself in a self-regulating of the flow. The specification explains at column 11, lines 24-25 that the "[f]low control is automatic because of the way the pipeline is constructed." The "pipeline" referred to here is the source/transform/sink object architecture discussed in claims 31 and 61 and in the specification including at column 8, line 9 to column 10, line 18. This architecture is "self-regulating" with respect to the flow of data down the pipeline as noted at column 8, lines 47-51 and column 11, lines 24-25. In other words, the transform object is not merely self-regulating in an abstract sense. Rather, it controls the flow of data through the pipeline.

8. Importantly, the transform object may be configured in many embodiments to exert flow control asynchronously with respect to the underlying video and audio data stream. The specification explains that the preferred flow control mechanisms occur "asynchronously to the data going through the pipeline. Thus, control of the flow of video 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." ('389 patent at column 8, lines 24-31) The specification explains that the centralized, flow-controlling transform object "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." ('389 patent column 8, lines 28-31) Elsewhere the specification teaches that the contemplated features also include pausing, "fast/slow reverse" and "fast/slow play." ('389 patent at column 6, lines 43-46).

9. These functions, sometimes referred to as "trick play" functions, place asymmetric, variable, and often heavy demands on system components such as the memory and processor. For instance, during fast forward the system accesses primarily i-frames. This places asymmetric, heavy demand on the output side. Asymmetric demands may also be imposed on the input side, for instance when the incoming video data rate is highly variable. During such periods of heavy, asymmetric demand, additional buffers are required on the input and/or output side to provide the data required to render the frames required to capture the data or by the user selected trick play function.

10. The automatic flow control which is exercised by the transform object facilitates intelligent management of the asymmetric demands placed on the input side (source object) and the output side (sink object). For example, it becomes possible in certain circumstances to temporarily reduce the flow on the input side in order to allow more resources to be devoted to the more challenging output flow in trick play. Conversely,

during periods of asymmetrically high data input rate (such as during scenes from action movies involving rapid scene changes), it is possible in certain circumstances to allocate relatively more buffers to the source object to avoid the dropping of video data on the input side.

11. For these reasons, a person skilled in the art would, in my opinion, understand from the claims and specification of the '389 patent that the transform object of the invention intelligently manages buffers or the manipulation of the video data so as to facilitate the system's ability to handle asymmetric memory demands of the source and sink objects.

12. The word "object" which is used as part of the claim term "transform object" has a well known meaning in computer science, being a collection of data and operations (as mentioned in the Office Action at page 3).

13. In the case of the present invention, the data associated with each of the source object, transform object, and sink object would include information regarding the flow. The specification explains that the preferred embodiment is implemented in terms of C++ classes. This is stated expressly at col. 8, lines 9-10, and is also consistent with other statements in the specification, for example the statement at col. 8, lines 66-67 that "[t]he MediaSwitch class 909 calls the allocEmptyBuf method of the TmkClipCache 912 object" and the reference at col. 9, lines 52-53 to "objects derived from the TmkXfrm class." C++ classes are a feature of the C++ language designed to group collections of functionally interrelated data and operations. The data would be the data members of the class while the operations are the methods of the class. Specific objects in C++ are generally called class instances. The state of an object in C++ is recorded in the data members and the associated data structures.

14. The specification makes repeated references to the manipulation of data and to particular operations carried out by objects, often identified by a name. The specification states that "[t]o obtain the buffer, the source object 901 asks the down stream object in his pipeline for a buffer (allocEmptyBuf)" and that the "sink . . . calls nextFullBuf which tells the transform 902 that it is ready for the next filled buffer." ('389 patent at column 8, lines 45 to 54) The specification continues: "When the sink 903 is finished with a buffer (i.e., it has consumed the data in the buffer) it calls releaseEmptyBuf . . . The MediaSwitch class 909 calls the allocEmptyBuf method of the TmkClipCache 912 object and receives a PES buffer from it. . . When the Vela decoder class 916 is finished with the buffer it calls releaseEmptyBuf." (Col. 8, line 55 to col. 9, line 17).

15. The objects disclosed in the specification are described as managing various aspects of the system operation. The specification teaches as follows in this regard: "The source object 901 takes data out of a physical data source, such as the Media Switch, and places it into a PES buffer. . . . The MediaSwitch class 909 . . . goes out to the circular buffers in the Media Switch hardware and generates PES buffers. . . . The

TmkClipCache 912 maintains a cache file 918 on a storage medium. . . . The Vela decoder class 916 talks to the decoder 921 in the hardware. . . . 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.” Col. 8, line 43 to col. 9, line 27.

16. The term “data” would thus be understood in this context to refer to a set of variable values or state information that reflects the state or progress of the operations. The term “operations” in this context would be understood refer to operations that manipulate the set of values or state information. Lastly, the term “collection” would be understood in this context to refer to a set of functionally interrelated data and operations, as explained in the specification.

17. Consistent with the individual meanings of the terms “collection,” “operation” and “data,” the term “object” in this context would in my opinion be understood by those skilled in the art to refer to a functionally interrelated set of state information typically a set of variable values which include information concerning the state or progress of the operations that relate to the state information.

18. Turning now to the Thomason reference on which the Examiner relies, it does not disclose a centralized entity like the claimed transform object that controls the flow, intelligently managing buffers or the manipulation of the video data so as to facilitate the system’s ability to handle asymmetric memory demands of the source and sink objects. Thomason’s teachings are in a sense the opposite of flow control, in that Thomason simply reacts to the flow and does not control it. This is so, as I discuss below, even taking into account the Examiner’s proposed modification of Thomason with teachings from the DMA Embedded Systems reference.

19. Thomason employs a FIFO architecture, for example in columns 5 and 6 and in FIGS. 1, 3a, 3b, and 4. In that FIFO architecture, data flows from the input buffers 4 to the buffer memory 35 to the main memory 36 and then back from there to the buffer memory 35 and to the output buffers 14. The FIFO architecture and data structures depicted in FIGS. 1, 3a, 3b, and 4 are designed on the assumption of a sequential one-directional flow – video comes in and passes through the channel selector 1, analog-to-digital converter 2, data compressor 3, buffers 4, buffer memory 35, main memory 36, buffers 14, data decompressor 13, digital-to-analog converter 12, acceleration controller 41, and PIP/postprocessing element 42.

20. Thomason’s FIFO architecture bypasses the bus 21 for the audio and video data flow, since it includes three DMA controllers 31, 32, 33 which each have their own data path separate from bus 21 to the buffers and, in the case of DMA controller 32, to main memory 36. This data path may be seen in FIG. 1 of Thomason as arrows going from buffers 4 to DMA controller 31, from DMA controller 31 to buffer memory 35, from buffer memory 35 to DMA controller 32, from DMA controller 32 to main memory 36

and vice versa, from DMA controller 32 to buffer memory 35, from buffer memory 35 to DMA controller 33, and from DMA controller 33 to buffers 14. The existence of these separate data paths conveys that they would be used to perform the DMA for speed and efficiency reasons.

21. Thomason does not disclose any capability to control the flow. Rather, Thomason just manages buffers in a reactive way in response to the flow. There is no disclosure in Thomason of the kind of intelligent management performed by the recited centralized transform object architecture, as might for example occur if the user has chosen a trick play mode.

22. In particular, the Thomason reference is silent about what happens if there is a greater need for resources such as buffers on the output side of the flow. In fact, due to trick play, it is on the output side where the system management is more complicated. This means in effect that Thomason is unsuited to effectively manage situations where the output is overtaxed by data flow demands.

23. One skilled in the art would not have used the synchronous DMA described in the DMA Embedded Systems reference in the Thomason system. The DMA Embedded Systems reference explains that "[t]he hardware moves one byte or word between memory and I/O each time the I/O port signals it is ready for another transaction. . . Then, the DMA controller goes idle again, waiting for another ready signal from the port." This type of DMA controller would be considered ill suited for the Thomason system because it is comparatively slow. The Thomason architecture, by contrast, is designed to maximize the data rate through the FIFO pipeline.

24. Even if one were to add to the system of Thomason the synchronous DMA of the DMA Embedded Systems reference, the "ready" line of that reference would not be controlling the flow. It would be asserted in the communications between input buffers 4 and the DMA controller 31. Use by the input buffers 4 to tell the DMA controller, in effect, "we have another word or byte for you," would prompt DMA controller 31 to pull that word or byte and send it to buffer memory 35. The "ready" line would thus not be controlling the flow, but rather would be a function of the flow.

25. Turning now to a separate issue, the Office Action identifies the "transform object" with the microprocessor 24 and DMA controller 32. Even to the extent one could say that the "ready" line exercises flow control, which I believe it does not, that "ready" line – being located along the path between input buffers 4 and DMA controller 31 – is not connected to either microprocessor 24 or DMA controller 32. Thus, any flow control that might arguably be carried out by the "ready" line would not be carried out, as the claims require, by the "transform object." In addition, the "ready" line identified above pertains to the input side of the flow, and thus to the source object recited in the claim. Even if one were to agree that the "ready" line identified above gave rise to flow control, there would be no flow control of the sink (output side) object.

26. Turning now to a possible combination of Thomason with Krause, one of the difficulties with such a combination is that if one starts to use an index of MPEG i-frames such as that taught in Krause, random access to the MPEG-encoded video stream is needed. The i-frames in an MPEG stream are separated from each other by frames of other types, and it is necessary to be able to skip over the frames of other types and get to just the i-frames.

27. In contrast, as already discussed at length above, the Thomason system uses a FIFO architecture that is not designed for random access to the video frames. The system is designed for moving information through the system in a sequential manner and is not adapted to access the data or frames in a non-sequential or random manner. In short, Thomason's disclosure is thus of a system not designed for, or compatible with, random frame access.

28. In my previous declaration at paragraph 45 I explained that Thomason does not contain any provision for enabling the "user command signals" identified between boxes 25 and 26 of FIG. 1 to be provided to the acceleration controller. I also explained how there is nothing in the Thomason specification that shows any functional connection between the user interface 26/user command ports 25 and the acceleration controller 41.

29. In order to combine the i-frame detector of Krause with the Thomason system the latter would have to be extensively rearchitected in light of the foregoing issues. For instance, Thomason would have to be altered so that it could accommodate random frame access, which is fundamentally inconsistent with its FIFO architecture.

30. A further deficiency of a combination of Thomason with Krause is that the combined system would be more complex and costly and yet less efficient. This would happen, for example, because the system would require additional memory to provide random frame access. Such additional memory would be required in order to hold the additional blocks of data that would need to be retrieved from which the i-frames would have to be selected. This would not be a good idea in Thomason's system which is already memory hungry. Thomason proposes to discard video data in buffers read from main memory 36, even though that makes it necessary to later reread the video data (col. 6, lines 5-12), in order to move memory buffers from output to input. Thomason's proposal reflects the fact that in the 1990s memory was a good deal more expensive than it is today and designers would go to great lengths to reduce memory consumption.

31. In addition to additional memory requirements, there would also be much higher demands on the main memory 36 when one is doing, for example, 10X fast forward. In this case one has to move through ten times as many of Thomason's FIFO data structures from main memory 36. For example, if main memory 36 is a hard drive, then a much faster hard drive would be needed in order to handle this demand using

Thomason combined with Krause while limiting oneself to a commercially reasonable amount of RAM.

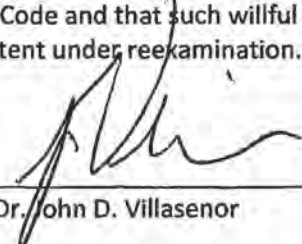
32. A final point to be made with respect to combining Thomason with Krause is that there is no advantage to the combination to the extent that Thomason already has what is described as a working implementation of trick play. There is no apparent reason why one would prefer Krause's trick play to what Thomason already claims to have. Any advantage one might gain from using Krause's trick play would be greatly outweighed by the disadvantages discussed above. A person of skill in the art at the time of the invention would simply not make such a combination given these disadvantages, particularly in light of the practical cost constraints to which a DVR would be subject.

33. Looking at Krause's disclosure, it does not help to correct any of the deficiencies of Thomason which have been described above. For example, Krause does not have any disclosure of a transform object like that which is claimed in claims 31 and 61. There is very little disclosure in Krause's description of the system's management of buffers. Krause does not address intelligent management of buffer use or data handling in order to accommodate the special demands of trick play which were discussed above.

34. Krause also does not discuss a DMA controller at all. The words "DMA" and "direct memory access" are not found in Krause. The hardware of Krause is shown at FIGS. 1 and 5. Thus, Krause does not have any teaching about the use of a system with synchronous DMA and a "ready" line, as suggested by the Office Action.

35. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent under reexamination.

Date: Sept 9, 2010



Dr. John D. Villasenor

Electronic Acknowledgement Receipt	
EFS ID:	8388837
Application Number:	90009329
International Application Number:	
Confirmation Number:	2859
Title of Invention:	MULTIMEDIA TIME WARPING SYSTEM
First Named Inventor/Applicant Name:	6233389
Customer Number:	26111
Filer:	Greg H. Gardella/Karen Heikkila
Filer Authorized By:	Greg H. Gardella
Attorney Docket Number:	2513.002REX0
Receipt Date:	09-SEP-2010
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Time Stamp:	22:53:48
Application Type:	Reexam (Patent Owner)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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Warnings:					
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3	NPL Documents	NPL1.pdf	9263107 ff7b603cec755bf7221126ff9d3e2c9ca8c34533	na	30
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Filed (SB/08)	SB08.pdf	229711 e92ce0033145648a18a10c2d7d15757e3d1b20602	no	4
Warnings:					
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5		RespOA.pdf	1048663 8748840494e373ab9903578e062cc81cd0127b5a	yes	23
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Reexam Response to Final Rejection		1	22	
	Reexam Certificate of Service		23	23	
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6	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	BartonDec.pdf	1301708 d8a5fa1e3f737db3197ec84e1e690c67053ae2ad	no	14
Warnings:					
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7	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	VillasenorDec.pdf	424134 a1904e77dbcc4e95879b0fe545a080d3dd8e9f1a	na	7
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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		90009329
	Filing Date		1998-07-30
	First Named Inventor	Barton	
	Art Unit		
	Examiner Name	Fred Ferris	
	Attorney Docket Number	155727-0007	

U.S.PATENTS								
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		90009329
	Filing Date		1998-07-30
	First Named Inventor	Barton	
	Art Unit		
	Examiner Name	Fred Ferris	
Attorney Docket Number		155727-0007	

1	"US 6,233,389 to Barton et al. Multimedia Time Warping System", Examiner Interview 90/009,329, Slidedeck, August 25, 2010, 30 pages.	☐
If you wish to add additional non-patent literature document citation information please click the Add button		
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Examiner Signature		Date Considered
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	90009329
	Filing Date	1998-07-30
	First Named Inventor	Barton
	Art Unit	
	Examiner Name	Fred Ferris
	Attorney Docket Number	155727-0007

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ 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 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Greg H. Gardella/	Date (YYYY-MM-DD)	2010-09-09
Name/Print	Greg H. Gardella	Registration Number	46,045

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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REEXAMINATION - PATENT OWNER POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Control Number(s)	90/009,329
	Filing Date(s)	July 30, 1998
	First Named Inventor	Barton et al.
	Title	Multimedia Time Warping System
	Patent Number	6,233,389
	Examiner Name	Fred Ferris
	Attorney Docket No(s).	155727-0007

I hereby revoke all previous patent owner powers of attorney given in the above-identified reexamination proceeding control number(s).

☐ A Power of Attorney is submitted herewith.

OR

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Please recognize or change the correspondence address for the above-identified reexamination proceeding control number(s) (more than one may be changed **only** if they are merged proceedings) to be:☒ The address associated with the above-mentioned Customer Number.

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Address

City

State

Zip

Country

Telephone

Email

I am the:

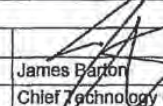
☐ Inventor, having ownership of the patent being reexamined.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Inventor or Patent Owner

Signature		Date	September 9, 2010
Name	James Barton	Telephone	408-519-9103
Title and Company	Chief Technology Officer		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: TiVo, Inc.

Application No./Patent No.: 6,233,389

Filed/Issue Date: 05/15/2001

Titled: MULTIMEDIA TIME WARPING SYSTEM

TiVo Inc., a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)
the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 009377, Frame 0779, or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

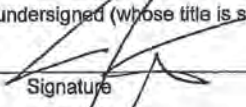
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.



Signature

James Barton

Printed or Typed Name

September 9, 2010

Date

Chief Technology Officer

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
90/009,329	11/10/2008	6233389	2513.002REX0

CONFIRMATION NO. 2859

POA ACCEPTANCE LETTER



29000
IRELL & MANELLA LLP
1800 AVENUE OF THE STARS
SUITE 900
LOS ANGELES, CA 90067

Date Mailed: 09/10/2010

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/09/2010.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sdstevenson/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
90/009,329	11/10/2008	6233389	2513.002REX0

CONFIRMATION NO. 2859

POWER OF ATTORNEY NOTICE

26111

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005



OC000000043447555

Date Mailed: 09/10/2010

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/09/2010.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sdstevenson/

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Bib Data Sheet

CONFIRMATION NO. 2859

SERIAL NUMBER 90/009,329	FILING OR 371(c) DATE 11/10/2008 RULE	CLASS 386	GROUP ART UNIT 3992	ATTORNEY DOCKET NO. 2513.002REX0
APPLICANTS 6233389, Residence Not Provided; TIVO, INC.(OWNER), SUNNYVALE, CA; DISH NETWORK CORPORATION(3RD.PTY.REQ.), ENGLEWOOD, CO; MORRISON & FOERSTER LLP, 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 ☐ yes ☐ no 35 USC 119 (a-d) conditions ☐ yes ☐ no ☐ Met after met Allowance Verified and Acknowledged _____ Examiner's Signature Initials		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS 61 INDEPENDENT CLAIMS 4
ADDRESS 29000				
TITLE MULTIMEDIA TIME WARPING SYSTEM				
FILING FEE RECEIVED 2520	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit	



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/009,329	11/10/2008	6233389	2513.002REX0	2859

29000 7590 10/06/2010

IRELL & MANELLA LLP
1800 AVENUE OF THE STARS
SUITE 900
LOS ANGELES, CA 90067

EXAMINER

ART UNIT PAPER NUMBER

DATE MAILED: 10/06/2010

Please find below and/or attached an Office communication concerning this application or proceeding.



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MORRISON & FOERSTER LLP

555 West Fifth Street, Suite 3500

Los Angeles, California 90013

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. 90/009,329.

PATENT NO. 6233389.

ART UNIT 3992.

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)).

**Notice of Intent to Issue
Ex Parte Reexamination Certificate**

Control No.

90/009,329

Patent Under Reexamination

6233389

Examiner

Fred Ferris

Art Unit

3992

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

1. ☒ Prosecution on the merits is (or remains) closed in this *ex parte* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. Cf. 37 CFR 1.313(a). A Certificate will be issued in view of

- (a) ☒ Patent owner's communication(s) filed: 09 September 2010.
 (b) ☐ Patent owner's late response filed: _____.
 (c) ☐ Patent owner's failure to file an appropriate response to the Office action mailed: _____.
 (d) ☐ Patent owner's failure to timely file an Appeal Brief (37 CFR 41.31).
 (e) ☐ Other: _____.

Status of *Ex Parte* Reexamination:

- (f) Change in the Specification: ☐ Yes ☒ No
 (g) Change in the Drawing(s): ☐ Yes ☒ No
 (h) Status of the Claim(s):

- (1) Patent claim(s) confirmed: 31 and 61.
 (2) Patent claim(s) amended (including dependent on amended claim(s)): _____.
 (3) Patent claim(s) canceled: _____.
 (4) Newly presented claim(s) patentable: _____.
 (5) Newly presented canceled claims: _____.
 (6) Patent claim(s) ☐ previously ☐ currently disclaimed: _____.
 (7) Patent claim(s) not subject to reexamination: 1-30 and 32-60.

2. ☒ Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."

3. ☐ Note attached NOTICE OF REFERENCES CITED (PTO-892).

4. ☒ Note attached LIST OF REFERENCES CITED (PTO/SB/08 or PTO/SB/08 substitute).

5. ☐ The drawing correction request filed on _____ is: ☐ approved ☐ disapproved.

6. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).

- a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have
☐ been received.
☐ not been received.
☐ been filed in Application No. _____.
☐ been filed in reexamination Control No. _____.
☐ been received by the International Bureau in PCT Application No. _____.

* Certified copies not received: _____.

7. ☐ Note attached Examiner's Amendment.

8. ☐ Note attached Interview Summary (PTO-474).

9. ☐ Other: _____.

cc: Requester (if third party requester)

U.S. Patent and Trademark Office
PTOL-469 (Rev. 05-10)

Notice of Intent to Issue Ex Parte Reexamination Certificate

Part of Paper No 20100924

DETAILED ACTION

Introduction

This Office Action is responsive to Patent owner's After Final amendment/arguments of September 9, 2010 in the *ex parte* reexamination of claims 31 and 61 in United States Patent Number 6,233,389 issued to Barton et al.

Patent owner's after final amendment/arguments and declarations from Villasenor and Barton filed on September 9, 2010 are entered and made of record.

The finality of the previous Office Action is withdrawn and the Patentability of claims 31 and 61 is now confirmed.

Reasons for Patentability/ Confirmation

The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

Patent owner's arguments filed September 9, 2010 in light of the second declaration from Villasenor are persuasive and the record is now made clear.

Specifically, Patent owner has now clarified and further defined the meaning of the claim terms "transform object", "source object", "sink object", and "automatic[ally] flow control[led]" in light of the understanding of the terms provided in the '389 specification. The examiner now interprets these terms in light of Patent owner's arguments, and as expressly disclosed in the '389 specification. Patent owner now submits the following understanding:

Regarding the term "automatic[ally] flow control[led]" as it relates to the term "transform object" the specification states (column 8, lines 48-49) that this automatic flow control manifests

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itself in a self-regulating of the flow. The specification explains at column 12, lines 24-25 that the "[f]low control is automatic because of the way the pipeline is constructed." The "pipeline" referred to here is the source/transform/sink object architecture discussed in claims 31 and 61 and in the specification including at column 8, line 9 to column 10, line 28. This architecture is "self-regulating" with respect to the flow of data down the pipeline as noted at column 8, lines 47-51 and column 21, lines 24-25. In other words, the transform object is not merely self-regulating in an abstract sense. Rather, it controls the flow of data through the pipeline.

(Villasenor at 7) Hence, the automatic flow control can be thought of as intelligent.

The transform object is configured to exert flow control asynchronously with respect to the underlying video and audio data stream. The specification explains that the preferred flow control mechanisms occur "asynchronously to the data going through the pipeline. Thus, control of the flow of video 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." ('389 patent at column 8, lines 24-31) (Villasenor at 8)

Regarding the recited "objects", Patent owner now explains that the data associated with each of the source object, transform object, and sink object would include information regarding the flow. The specification explains that the preferred embodiment is implemented in terms of C++ classes. This is stated expressly at col. 8, lines 9-10, and is also consistent with other statements in the specification, for example the statement at col. 8, lines 66-67 that "[t]he MediaSwitch class 909 calls the allocEmptyBuf method of the TmkClipCache 912 object" and the reference at col. 9, lines 52-53 to "objects derived from the TmkXfrm class." C++ classes are

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a feature of the C++ language designed to group collections of functionally interrelated data and operations. The data would be the data members of the class while the operations are the methods of the class. Specific objects in C++ are generally called class instances. The state of an object in C++ is recorded in the data members and the associated data structures. (Villasenor at 13)

Patent owner further explains that the specification makes repeated references to the manipulation of data and to particular operations carried out by objects. The specification states that "[t]o obtain the buffer, the source object 901 asks the down stream object in his pipeline for a buffer (allocEmptyBuf)" and that the "sink... calls nextFullBuf which tells the transform 902 that it is ready for the next filled buffer." (389 patent at column 8, lines 45 to 54) The specification continues: "When the sink 903 is finished with a buffer (i.e., it has consumed the data in the buffer) it calls releaseEmptyBuf... The MediaSwitch class 909 calls the allocEmptyBuf method of the TmkClipCache 912 object and receives a PES buffer from it... When the Vela decoder class 916 is finished with the buffer it calls releaseEmptyBuf." (Col. 8, line 55 to col. 9, line 17). (Villasenor at 14)

The objects disclosed in the specification are described as managing various aspects of the system operation. The specification teaches as follows in this regard:

"The source object 901 takes data out of a physical data source, such as the Media Switch, and places it into a PES buffer The MediaSwitch class 909... goes out to the circular buffers in the Media Switch hardware and generates PES buffers The TmkClipCache 912 maintains a cache file 918 on a storage medium The Vela decoder class 916 talks to the decoder 921 in the hardware The control object 917 accepts commands from the user and

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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." Col. 8, line 43 to col. 9, line 27. (Villasenor at 15)

Each object (source 901, transform 902, and sink 903) is multi-threaded by definition and can run in parallel as noted at column 8, lines 16-18.

The term "data" would thus be understood in this context to refer to a set of variable values or state information that reflects the state or progress of the operations. The term "operations" in this context would be understood refer to operations that manipulate the set of values or state information. Lastly, the term "collection" would be understood in this context to refer to a set of functionally interrelated data and operations, as explained in the specification. (Villasenor at 16)

Turning now to the prior art, as now understood in light of the above explanation, Thomason lacks a centralized entity like the claimed transform object that controls the flow and intelligently manages buffers or the manipulation of video/audio data to facilitate handling asymmetric memory demands of the claimed source and sink objects. Thomason does not appear to disclose any capability to control the flow as claimed. Rather, Thomason just manages buffers in a reactive way in response to the flow. There is no disclosure in Thomason of the kind of intelligent management performed by the recited centralized transform object architecture as disclosed in the '389 patent. (Villasenor at 21)

Prior art Krause similarly does not have any disclosure of a transform object like that which is claimed in-claims 31 and 61. There is very little disclosure in Krause's description of the system's management of buffers. Krause does not address intelligent management of buffer use

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or data handling via the claimed objects explained above. (Villasenor at 34) Further, one skilled in the art would understand that Thomason's FIFO system architecture would be fundamentally inconsistent with random frame access (i-Frames) system architecture of Krause and therefore technically difficult to combine. (Villasenor at 26-30)

In light of the above understanding, Thomason and Krause do not teach or render obvious a transform object that automatically flow controls source and sink objects as claimed.

Accordingly, the 35 USC 103(a) rejection of claims 31 and 61 over Thomason in view of Krause is hereby withdrawn.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

Conclusion

Any paper filed with the USPTO, i.e., any submission made, by either the Patent Owner or the Third Party Requester must be served on every other party in the reexamination proceeding, including any other third party requester that is part of the proceeding due to merger of the reexamination proceedings. As proof of service, the party submitting the paper to the Office must attach a Certificate of Service to the paper, which sets forth the name and address of the party served and the method of service. Papers filed without the required Certificate of Service may be denied consideration. 37 CFR 1.903; MPEP 2666.06.

Application/Control Number: 90/009,329

Page 7

Art Unit: 3992

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Central Reexamination Unit
Commissioner for Patents
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 should be directed to the Central

Reexamination Unit at telephone number (571) 272-7705.

Fred Ferris
Primary Examiner
AU 3992

Conferees: *ATK*
ESK



Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/06a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	90009329
	Filing Date	1998-07-30
	First Named Inventor	Barton
	Art Unit	
	Examiner Name	Fred Ferris
	Attorney Docket Number	155727-0007

U.S. PATENTS							
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1						
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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1						
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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
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NON-PATENT LITERATURE DOCUMENTS							
Examiner Initials*	Cite No	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, pages(s), volume-issue number(s), publisher, city and/or country where published.					T ⁵

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

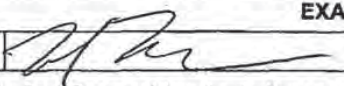
Application Number	90009329
Filing Date	1998-07-30
First Named Inventor	Barton
Art Unit	
Examiner Name	Fred Ferris
Attorney Docket Number	155727-0007

NOT
NPL & PATENT

1	"US 6,233,889 to Barton et al. Multimedia Time Warping System", Examiner Interview 90/009,329, Slidedeck, August 25, 2010, 30 pages.	☐
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If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	9/23/10
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>				Complete if Known	
				Application Number	90/009,329
				Filing Date	November 10, 2008
				First Named Inventor	James M. BARTON
				Art Unit	3992
Examiner Name	Ferris III, Fred O.				
Attorney Docket Number	2513.002REX0				
Sheet	1	of	1		
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials*	Cite No. ¹	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 ²
ESK	NPL56	U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, TiVo Inc. v. Echostar Corporation et al., 2009-1374, Order Affirming Contempt Ruling, March 4, 2010.			
	NPL				
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	NPL				
	NPL				
	NPL				
	NPL				

Examiner Signature	<i>ESK Head for Ferris</i>	Date Considered	9/29/10
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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>		Application Number	90/009,329
		Filing Date	November 10, 2008
		First Named Inventor	James M. BARTON
		Art Unit	3992
		Examiner Name	Ferris III, Fred O.
		Attorney Docket Number	2513.002REX0
Sheet	1	of	1

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
ESIC	US77	2,865,990	12-23-1958	Towler	
	US78	4,566,034	01-21-1986	Harger <i>et al.</i>	
	US79	5,497,244	03-05-1996	Chargin, Jr. <i>et al.</i>	
	US80	5,510,858	04-23-1996	Shido <i>et al.</i>	
	US81	5,557,724	09-17-1996	Sampat <i>et al.</i>	
	US82	5,574,662	11-12-1996	Windrem <i>et al.</i>	
	US83	5,721,817	02-24-1998	Kurihara <i>et al.</i>	
	US84	5,805,804	09-08-1998	Laursen <i>et al.</i>	
	US85	5,864,582	01-26-1999	Ander <i>et al.</i>	
	US86	5,898,695	04-27-1999	Fujii <i>et al.</i>	
	US87	5,940,074	08-17-1999	Britt, Jr. <i>et al.</i>	
	US88	5,990,881	11-23-1999	Inoue <i>et al.</i>	
	US89	6,163,646	12-19-2000	Tanaka <i>et al.</i>	
	US90	6,172,712 B1	01-09-2001	Beard	
	US91	6,181,706 B1	01-30-2001	Anderson <i>et al.</i>	
	US92	6,209,041 B1	03-27-2001	Shaw <i>et al.</i>	
	US93	6,317,885 B1	11-13-2001	Fries	
	US94	6,359,636 B1	03-19-2002	Schindler <i>et al.</i>	
	US95	6,490,000 B1	12-03-2002	Schaefer <i>et al.</i>	
	US				

FOREIGN PATENT DOCUMENTS					
Examiner Initials*	Cite No.	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code ¹ Number ¹ Kind Code ² (if known)			
	FP				
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Examiner Signature	<i>E. Ferris</i>	Date Considered	9/29/10
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Substitute for form 1449/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>		Application Number	90/009,329
		Filing Date	November 10, 2008
		First Named Inventor	James M. BARTON
		Art Unit	3992
		Examiner Name	Ferris III, Fred O.
Sheet	1	of	4
		Attorney Docket Number	2513.002RFX0
NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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 ²
	NPL62	U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, AT&T's and Microsoft Corporation's Invalidity Contentions, TiVo Inc. vs. AT&T Inc. and Microsoft Corporation, Case No. 2:09-CV-259-DF, 44 pages, May 21, 2010.	
	NPL63	Exhibit A14 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,018,612, and in further view of U.S. Patent No. 5,477,263 and U.S. Patent No. 6,169,843, 11 pages.	
	NPL64	Exhibit A1 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,557,724 to Sampat, 23 pages.	
	NPL65	Exhibit A12 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,721,815 to Ottesen et al., 18 pages.	
	NPL66	Exhibit A8 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,822,493, 161 pages.	
	NPL67	Exhibit A13 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,018,612 to Thomason, et al. and further in view of U.S. Patent No. 5,949,948 to Krause et al., 7 pages.	
	NPL68	Exhibit A20 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,990,881, 6 pages.	
	NPL69	Exhibit A2 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,169,843, 6 pages.	
	NPL70	Exhibit A6 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,172,712, 137 pages.	
	NPL71	Exhibit A3 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,181,706, 5 pages.	

Examiner Signature		Date Considered	9/29/10
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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>		Complete if Known			
		Application Number	90/009,329		
		Filing Date	November 10, 2008		
		First Named Inventor	James M. BARTON		
		Art Unit	3992		
		Examiner Name	Ferris III, Fred O.		
Sheet	2	of	4	Attorney Docket Number	2513.002REX0
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials*	Cite No. ¹	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 ²
EK	NPL72	Exhibit A5 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,209,041, 140 pages.			
	NPL73	Exhibit A19 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,304,714 to Krause et al., 7 pages.			
	NPL74	Exhibit A23 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of DISHPlayer 7100 System and U.S. Patent No. 6,490,000, 21 pages.			
	NPL75	Exhibit A9 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 6,490,000, 134 pages.			
	NPL76	Exhibit A4 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 7,272,298 to Richard Lang, 11 pages.			
	NPL77	Exhibit A7 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of Graham Thomason, EP0594241, 136 pages.			
	NPL78	Exhibit A22 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of Developing Object-Oriented Multimedia Software by Phillip Ackermann, 9 pages.			
	NPL79	Exhibit A10 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of C. Hanna et al., Demultiplexer IC For MPEG2 Transport Streams, 138 pages.			
	NPL80	Exhibit A11 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of Robert Johnston, A Digital Television Sequence Store, 148 pages.			
	NPL81	Exhibit A16 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of "A Programming System for the Dynamic Manipulation of Temporally Sensitive Data" by Christopher J. Lindblad, 16 pages.			

Examiner Signature	<i>E. Ferris</i>	Date Considered	9/29/10
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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Substitute for form 1449/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i>		Application Number	90/009,329
		Filing Date	November 10, 2008
		First Named Inventor	James M. BARTON
		Art Unit	3992
		Examiner Name	Ferris III, Fred O.
Sheet	3	of	4
		Attorney Docket Number	2513.002REX0
NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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 ²
ESK	NPL82	Exhibit A15 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of "StreamObjects: Dynamically-Segmented Scalable Media Over the Internet" by Steven Niemczyk, 17 pages.	
	NPL83	Exhibit A17 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of "An Architecture for Networked Multimedia" by Jonathan C. Soo, 12 pages.	
	NPL84	Exhibit A18 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of "Design of a Storage and Retrieval Model for Multimedia Data" by Ruihong Wang, 11 pages.	
	NPL85	Exhibit A21 to AT&T's and Microsoft Corporation's Invalidity Contentions: Claim Chart of U.S. Patent No. 6,233,389 in view of U.S. Patent No. 5,898,695, 6 pages.	
	NPL86	Ash, Robert, <i>Real-Time Encoding and Feeds in Oracle Video Server</i> , Oracle Corporation, entire document (March 1998).	
	NPL87	Cline, Linda S. et al., "DirectShow™ RTP Support for Adaptivity in Networked Multimedia Applications," <i>Proc. of the IEEE International Conference on Multimedia Computing and Systems</i> , 10 pages (1998).	
	NPL88	Hanna, C. et al., "Demultiplexer IC for MPEG2 Transport Streams," <i>IEEE Transactions on Consumer Electronics</i> , Vol. 41, No. 3, pp. 699-706 (August 1995).	
	NPL89	Kurioka, Tatsuya et al., "Television Home Server for Integrated Services - Toward the Realization of ISDB 'Anytime' Services," <i>Proceedings ISCE '97, IEEE International Symposium on Consumer Electronics</i> , pp. 250-253 (Dec. 2, 1997).	
	NPL90	Lindblad, Christopher, <i>A Programming System for the Dynamic Manipulation of Temporally Sensitive Data</i> , MIT Laboratory for Computer Science, 275 pages (August 1994).	
	NPL91	Linden, Brian and Prather, Matt, <i>Oracle Video Server: Introducing the Oracle Video Server</i> , Release 3.0, entire document (1998).	

Examiner Signature	<i>Eui Ferris for Ferris</i>	Date Considered	9/29/10
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		Application Number	90/009,329
		Filing Date	November 10, 2008
		First Named Inventor	James M. BARTON
		Art Unit	3992
Examiner Name	Ferris III, Fred O.		
Attorney Docket Number	2513.002REX0		
Sheet	4	of	4
NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.	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 ²
ESK	NPL92	Niemczyk, Steven, <i>Stream Objects: Dynamically Segmented Scalable Media Over the Internet</i> , Thesis, Massachusetts Institute of Technology, 90 pages (May 27, 1996).	
	NPL93	Oracle Corporation, <i>Video-Enhanced Web Services</i> , An Oracle, DIGITAL, Ericsson and Acorn White Paper, entire document (March 1998).	
	NPL94	Soo, Jonathan, <i>An Architecture for Networked Multimedia</i> , Thesis, Massachusetts Institute of Technology, 49 pages (May 1995).	
	NPL95	Tektronix PDR 100 Profile™ Video Disk Recorder, User Manual, entire document (First Printing: February 1995, Revised: August 1995).	
	NPL96	Wang, Ruihong, <i>Design of a Storage and Retrieval Model for Multimedia Data</i> , Thesis, University of Ottawa, 116 pages (1994).	
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Search Notes

Application/Control No.

90/009,329

Examiner

Fred Ferris

Applicant(s)/Patent under
Reexamination

6233389

Art Unit

3992

SEARCHED

Class	Subclass	Date	Examiner
386	46	9/24/2010	FOF

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner

**SEARCH NOTES
(INCLUDING SEARCH STRATEGY)**

	DATE	EXMR
Reveiwed prior art of record	9/24/2010	FOF

Issue Classification 	Application/Control No. 90/009,329	Applicant(s)/Patent under Reexamination 6233389
	Examiner Fred Ferris	Art Unit 3992

ISSUE CLASSIFICATION												
ORIGINAL				INTERNATIONAL CLASSIFICATION								
CLASS		SUBCLASS		CLAIMED				NON-CLAIMED				
386		46		G	11	B	27	/10				/
CROSS REFERENCES				G	11	B	27	/034				/
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											
348	E5.007	E5.108		H	04	N	5	/775				/
386	68	E5.043	E5.07	G	11	B	27	/031				/
				H	04	N	5	/44				/
				H	04	N	5	/00				/
				G	11	B	27	/032				/
				Fred Ferris (Primary Examiner)				Total Claims Allowed: 2				
(Assistant Examiner) (Date)				(Date) 9/24/10				O.G. Print Claim(s) 31		O.G. Print Fig. 1		
(Legal Instruments Examiner) (Date)												

☒ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		31		61		121		181
	2		32		62		122		182
	3		33		63		123		183
	4		34		64		124		184
	5		35		65		125		185
	6		36		66		126		186
	7		37		67		127		187
	8		38		68		128		188
	9		39		69		129		189
	10		40		70		130		190
	11		41		71		131		191
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CONFIRMATION NO. 2859

SERIAL NUMBER 90/009,329	FILING OR 371(c) DATE 11/10/2008 RULE	CLASS 386	GROUP ART UNIT 3992	ATTORNEY DOCKET NO. 2513.002REX0
APPLICANTS 6233389, Residence Not Provided; TIVO, INC.(OWNER), SUNNYVALE, CA; DISH NETWORK CORPORATION(3RD.PTY.REQ.), ENGLEWOOD, CO; MORRISON & FOERSTER LLP, 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 ☐ yes ☒ no 35 USC 119 (a-d) conditions ☐ yes ☒ no ☐ Met after met Allowance		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS 61 INDEPENDENT CLAIMS 4
Verified and Acknowledged Examiner's Signature: [Signature] Initials: [Initials]				
ADDRESS 29000				
TITLE MULTIMEDIA TIME WARPING SYSTEM				
FILING FEE RECEIVED 2520	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit	



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/009,329	11/10/2008	6233389	2513.002REX0	2859

29000 7590 10/15/2010

IRELL & MANELLA LLP
1800 AVENUE OF THE STARS
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LOS ANGELES, CA 90067

EXAMINER

ART UNIT PAPER NUMBER

DATE MAILED: 10/15/2010

Please find below and/or attached an Office communication concerning this application or proceeding.



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THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS
MORRISON & FOERSTER LLP
DAVID L. FEHRMAN
555 WEST FIFTH STREET
LOS ANGELES, CA 90013

Date:

MAILED

OCT 15 2010

CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90009329
PATENT NO. : 6233389
ART UNIT : 3992

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)).



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(For Patent Owner)

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OCT 15 2010

CENTRAL REEXAMINATION UNIT

MORRISON & FOERSTER, LLP
555 WEST FIFTH STREET
SUITE 3500
LOS ANGELES, CA 90013-1024

(For Requester)

In re Barton *et alia*
Reexamination Proceeding
Control No. 90/009,329
For: U.S. Patent No. 6,233,389

: DECISION *SUA SPONTE*
: RETURNING UNTIMELY
: FILED PAPERS

The *ex parte* reexamination is before the Central Reexamination Unit for consideration of papers filed October 8, 2010.

REVIEW OF RELEVANT FACTS

1. U.S. Patent No. 6,233,389 (hereinafter, the '389 patent), issued to Barton *et alia*, on May 15, 2001.
2. On November 10, 2008, a third party deposited a request for *ex parte* reexamination of the '389 patent. The reexamination proceeding was assigned Control No. 90/009,329 (hereinafter, the '9329 proceeding).
3. On January 7, 2009, an order granting the request for reexamination was mailed.

Art Unit: 3992

4. On October 6, 2010, a "Notice of Intent to Issue *Ex Parte* Reexamination Certificate" (NIRC) was mailed for the '9329 proceeding.
5. On October 8, 2010, an Information Disclosure Statement (IDS) was filed in the '9329 proceeding.

DECISION

MPEP 2287 states, in part:

A NIRC informs the patent owner and any third party requester that the reexamination prosecution has been terminated. The rules do not provide for an amendment to be filed in a reexamination proceeding after prosecution has been terminated. The provisions of 37 CFR 1.312 do not apply in reexamination. Any amendment, information disclosure statement, or other paper related to the merits of the reexamination proceeding filed after prosecution has been terminated must be accompanied by a petition under 37 CFR 1.182 to have the amendment considered.

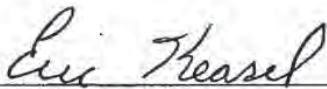
MPEP 2267 states, in part:

The applicable regulations (37 CFR 1.501(a), 1.550(e)) provide that certain types of correspondence will not be considered or acknowledged unless timely received. Whenever reexamination correspondence is received, a decision is required of the Office as to the action to be taken on the correspondence based on what type of paper it is and whether it is timely. The return of inappropriate submissions complies with the regulations that certain papers will not be considered.

The IDS filed on October 8, 2010 is an untimely submission and was not accompanied by a petition under 37 CFR 1.182. Since this proceeding is not a paper file, the paper submitted on October 8, 2010 is being "closed" from public view (while MPEP 2267 permits for the return of inappropriate or untimely submissions, this may not be possible in an Image File Wrapper (IFW) proceeding where a paper is inadvertently entered into the record. Instead, such a paper would be marked "closed" and "not public").

CONCLUSION

1. The untimely paper filed October 8, 2010 is hereby expunged from the record of reexamination proceeding 90/009,329 by retaining it as "closed" from public view.
2. The reexamination proceeding remains in the Office of Publications for issuance of the Reexamination Certificate in due course.
3. Telephone inquiries related to this decision should be directed to Eric Keasel, at (571) 272-4929 or Mark Reinhart, at (571) 272-1611.



Eric Keasel

SPE, AU 3992, Central Reexamination Unit

Reexamination 	Application/Control No. 90/009,329	Applicant(s)/Patent Under Reexamination 6233389
	Certificate Date	Certificate Number 62 C2

Requester	Correspondence Address:	☐ Patent Owner	☒ Third Party
MORRISON & FOERSTER LLP 555 West Fifth Street, Suite 3500 Los Angeles, California 90013			

LITIGATION REVIEW ☒	FOF (examiner initials)	1/6/09 (date)
Case Name		Director Initials
Open: 1:08cv327 Dish Network Corporation et al v. Tivo Inc		<i>Dir</i> <i>Reasel</i> <i>to</i> <i>GM</i>
Closed: 1:05cv2799 Tivo, Inc v. Echostar Communications Corporation et al		
Closed: 1:05mi208 Tivo, Inc v. Echostar Communications Corporation et al		
Closed: 1:05mi190 Tivo, Inc v. Echostar Communications Corporation et al		
Open: 2:04cv1 Tivo Inc v. Echostar Comm, et al Open: 3:02cv365 Tivo Inc, v. Sonicblue Incorporated et al Closed: 4:02cv365		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
1. no concurrent office proceedings	
2.	
3.	
4.	

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

Approved for use through 07/31/2012 OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	90009329
	Filing Date	1998-07-30
	First Named Inventor	Barton
	Art Unit	3992
	Examiner Name	Fred O Ferris III
	Attorney Docket Number	155727-0007

U.S. PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1	6181706		2001-01-30	Richard Eugene Anderson et al.		
	2	6169843		2001-01-02	Michael P. Lenihan et al.		
	3	5557724		1996-09-17	Ketan Sampat et al.		
	4	5721878		1998-02-24	Hal Hjalmar Ottesen et al.		
	5	6018612		2000-01-25	Graham G. Thomason et al.		
	6	6304714		2001-10-16	Edward A. Krause et al.		
	7	7272298		2007-09-18	Richard A. Lang et al.		
	8	5164839		1992-11-17	Richard A. Lang		

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	2	0762756	EP		2002-03-06	Seishi Sasaki		☐
	3	WO1992/022983	WO		1992-12-23	Lee H. Browne		☐

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	1	JONATHAN C. SOO, "An Architecture for Networked Multimedia", Submitted to the Department of Electrical Engineering and Computer Science at the Massachusetts Institute of Technology, May 1995.	☐

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Art Unit	3992
Examiner Name	Fred O Ferris III
Attorney Docket Number	155727-0007

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
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Attorney Docket Number	155727-0007

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

- ☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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- ☐ See attached certification statement.
- ☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- ☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Greg H. Gardella/	Date (YYYY-MM-DD)	2010-10-25
Name/Print	Greg H. Gardella	Registration Number	46045

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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EP 0 594 241 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
06.05.1999 Bulletin 1999/18

(51) Int Cl.⁶: **G06F 3/06, G06F 5/06,
G06F 7/00, H04N 5/44,
H04N 5/45**

(21) Application number: **93202871.5**

(22) Date of filing: **12.10.1993**

(54) **Arrangement for storing an information signal in a memory and retrieving the information signal from said memory**

Gerät zur Speicherung eines Datensignals in einem Speicher und zur Wiedergabe des Datensignals aus diesem Speicher

Appareil de mémorisation d'un signal d'information dans une mémoire et de recouvrement du signal d'information de la mémoire en question

(84) Designated Contracting States:
AT DE FR GB

(30) Priority: **19.10.1992 EP 92203191**

(43) Date of publication of application:
27.04.1994 Bulletin 1994/17

(73) Proprietor: **Koninklijke Philips Electronics N.V.
5621 BA Eindhoven (NL)**

(72) Inventors:
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c/o INT. OCTROOIBUREAU B.V.
NL-5656 Eindhoven (NL)**

• **Van Loon, Paul M.,
c/o INT. OCTROOIBUREAU B.V.
NL-5656 Eindhoven (NL)**

(74) Representative:
**van der Kruk, Willem Leonardus et al
INTERNATIONAAL OCTROOIBUREAU B.V.,
Prof. Holstlaan 6
5656 AA Eindhoven (NL)**

(56) References cited:
WO-A-90/08999 WO-A-91/13695

• **COMPUTER DESIGN, vol.25, no.6, March 1986,
LITTLETON, MASSACHUSETTS US pages 87 - 92
WINTERSTEIN 'CACHE DESIGN BOOSTS SMD
DISK DRIVE PERFORMANCE'**

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Description

[0001] The invention relates to an arrangement for storing an information signal in a memory and retrieving the information signal from said memory, the arrangement including the memory, an input terminal for receiving the information signal, an output terminal for supplying a delayed version of the information signal, an input buffer memory, having an input coupled to the input terminal and an output coupled to an input of said memory, and an output buffer memory having an input coupled to the output of said memory and an output coupled to said output terminal.

[0002] Published international patent application no. WO91/13695 discloses the temporary storage of a video signal in a memory. Using this known arrangement, an information signal can be stored in the memory and an information signal previously stored in said memory can be retrieved simultaneously from said memory. The memory can be in the form of an optical disk or a magnetic disk, such as a hard disk or a disk-array. The arrangement can be used in a television apparatus or a videorecorder so as to store a video signal in the memory.

[0003] One application of the arrangement is where live television signal transmissions are continuously recorded and a history is maintained as far back as the extent of the memory will permit. For some applications, the memory capacity of the memory can be such that it permits the storage of a video signal having a length of a few minutes. For other applications a memory capacity corresponding to a length of about 15 minutes is considered a minimum practical amount.

[0004] The arrangement offers a number of interesting features to a user.

[0005] Individual choice of the time at which a program is watched. For example, suppose at ten past eight the viewer wants to start watching the eight o'clock news (from the beginning, of course). Using the arrangement, provided the right channel has been monitored, the viewer jumps back ten minutes in time, as it were, and watches the news from the start. Unlike the case where the programme is recorded on a conventional video recorder, the viewer does not have to wait until the program has finished before watching it.

[0006] Continuity after an interruption. If the viewer is interrupted while watching a programme, for example by a telephone call or a call at the door, he can resume watching the program from the point at which he was interrupted. This functionality is not possible with a conventional video-recorder.

[0007] A practical solution to program overlap. Suppose a programme on one channel doesn't finish until ten minutes after the start of a programme on another channel. The prior art permits one to watch both programmes without the use of a video recorder. During the first programme, the viewer ensures that the channel of the second programme is being monitored. After the first

programme has ended, the viewer switches to the other channel and jumps back to the start of the programme. An important advantage over using a video recorder is that one does not have to wait until the recording has finished before the programme can be watched.

[0008] Individual replays, including slow motion. The viewer can see a replay of an event just seen, (or just missed, or not fully understood) and then continue watching the programme from the point where the replay was started. Moreover, the replays can be watched in slow motion.

[0009] Belated decision to record on video recorder possible. A viewer may decide after watching a programme for ten minutes that the programme is worth recording onto video. With the arrangement, he can retrospectively start video-recording, whilst continuing to watch the programme live.

[0010] Additional features of the arrangement are:

[0011] A means of accelerating the viewing of a historical programme. If the viewer is not watching live, e.g. due to a later programme start or an interruption, he can catch up with the live broadcast by accelerating the playback. An acceleration factor of a few per cent is practically unnoticed by the viewer. The circuitry (disk read-out, demultiplexing, data decompression, d/a conversion etc.) must be capable of processing the data at the accelerated rate. The sound can be specially processed so that the speed is accelerated without an undue increase in tone.

[0012] A means of fast-accelerating over a historical programme. In this case not all television picture data is necessarily processed - some may be skipped and not be passed on for demultiplexing and decompression.

[0013] A fast reverse function.

[0014] A picture-in-picture (PIP) processing unit to enable combinations of live and historical programmes to be displayed using picture-in-picture formats.

[0015] In order to enable an uninterrupted storage of a live television programme in the main memory, and enable an uninterrupted and simultaneous retrieval of the historical programme from the main memory, an input buffer memory and an output buffer memory are present. Data arriving for storage in the main memory, whilst the main memory is temporarily busy for another operation, will be stored in the input buffer memory, and will be stored at a later moment in the main memory by retrieving the data from the input buffer memory. Data will also be requested regularly from the main memory to be displayed on a TV screen as a historical programme. Again, the main memory may be temporarily busy for another operation, so data must be readily available in the output buffer memory, so as to provide continuity of viewing for the user.

[0016] The invention as claimed in claim 1 provides for an improvement in relation to the memories included in the arrangement. For that purpose, the input buffer memory and the output buffer memory are combined into one single buffer memory.

[0017] The invention is based on the following recognition. In an ideal operation of the input buffer memory, the control of the data transfer through the input buffer memory should be such that, in order to absorb a maximum amount of data without a transfer of data from the input buffer memory to the main memory, the input buffer memory should be empty. Further, in an ideal operation of the output buffer memory, the control of the data transfer through the output buffer memory should be such that, in order to provide a maximum amount of data to be displayed on the screen without a transfer of data from the main memory to the output buffer memory, the output buffer memory should be full. These requirements offer the possibility to combine the input buffer memory and the output buffer memory into one shared memory, to be used as efficiently as possible under the administration realized by a microprocessor.

[0018] The invention is specifically useful in the situation where the main memory is a hard-disk arrangement, and where the hard-disk arrangement has a single magnetic head for storing the information signal on and retrieving the information signal from the hard disk included in the hard-disk arrangement. It should however be noted that also in disk arrangements having more than one head, situations can occur where an interrupted storage on or retrieval from the disk is not possible, such as in the case where a head has to jump to another storage location and information flow interruption can not be corrected by another head. Further, it should be noted that, where the description discloses the storage of a single information signal in and retrieval of said information signal from the main memory, it is equally well possible to apply the inventive concept to the storage and retrieval of a number of two or more information signals in/from the main memory, eg. derived from different program channels.

[0019] The invention will be further described in the following figure description, in which

figure 1 discloses an embodiment of the arrangement,

figure 2 discloses a more simplified embodiment,

figure 3 discloses a buffer memory in the form of a FIFO, and

figure 4 discloses a buffer memory in the form of a reversible FIFO.

[0020] Figure 1 discloses an embodiment of the arrangement. One or more television signals first pass through a channel selector 1, which selects which transmissions, according to their channel, are to be stored, and which transmissions, according to their channel, are required for live display. The transmissions which are selected to be stored are digitized by means of a/d (analogue to digital) converters 2. The digital data is then compressed in real time by a data compressor 3. The output of each channel after being compressed by the data compressor 3 is placed in a buffer 4, of which there

is at least one per selected channel. The buffers 4 also act as a multiplexer because they can be read out in such a way as to convert several parallel data streams into one data stream (although the different streams are separately administered). The information contained in the buffers 4 will be transferred to the buffer memory 35 under supervision of a microprocessor 24 by a DMA (direct memory access) controller 31, and is identifiable as input destined for a main memory 36, which is in the form of a hard disk arrangement. The microprocessor 24 initiates the data transfer from the buffer 4 to the buffer memory 35, and performs memory allocation in the buffer memory. The microprocessor 24 runs ROM- (read-only memory) 22 based software and makes use of a working RAM (random access memory) 23 for temporary variables, the administration of the buffer memory 35, storage of user commands and the user status etc. Input data in the buffer memory 35 is transferred to the main memory 36 as soon as it is convenient under supervision of the microprocessor 24 by another DMA controller 32.

[0021] The stored data in main memory 36 is in due course transferred to the buffer memory 35 under supervision of the microprocessor 24 by DMA controller 32. DMA controller 32 cannot at the same time be required or used for transferring data in the opposite direction. As television data is actually required to be displayed on the television screen, it is transferred under supervision of the microprocessor 24 by DMA controller 33 to a buffer 14. The process of transfer of data from main memory 36 to the buffer memory 35, and from the buffer memory 35 to the buffers 14 takes place separately for channels which the viewer has selected as historical channels to be viewed or recorded or used for any other purpose. An adequate supply of data per channel must always be present in the buffer memory 35 to be able to keep up with the demand. Data is taken from the buffers 14 and is decompressed by a data decompressor 13, and is converted to an analogue signal by a d/a (digital to analogue) converter 12. The output of the d/a converter 12 can be sent to a video recorder or television. An acceleration controller 41 has various tasks - it controls the acceleration rate at which data is required, including providing for slow motion and frozen frames and frame stepping. It also provides for fast forward and fast reverse functions. The DMA controller 33, buffers 14, data decompressor 13 and d/a (digital to analogue) converters 12 should all be capable of working slightly faster (say 15%) than real time, so that an accelerated playback can be provided without loss of data until the acceleration controller 41 generates an accelerated display at a standard frame-rate. Live transmissions and historical transmissions can be simultaneously displayed using PIP = (picture-in-picture) techniques by a PIP/postprocessor 42.

[0022] It may be advantageous to combine the buffer memory 35 and working RAM (random access memory) 23 into one memory.

[0023] The buffer memory 35 enables a single head hard disk to cope with the dual task of writing the TV signal being monitored and simultaneously reading out the signal to be displayed.

[0024] Referring now to figure 2, conceptually, when the arrangement is in operation, there is a flow of data as follows.

[0025] Data arrives at the input terminal 50 for storage on the main memory 36, but as the disk in the main memory 36 may be temporarily busy for another operation, the data arriving will be buffered in input buffer 35a, by applying the data to the input 59a of said input buffer 35a. As soon as the disk is capable of receiving the data, the data stored in the input buffer 35a is supplied to the output 51a of the buffer 35a and applied to the input 54 of the main memory 36, for storage on the disk.

[0026] Data will also be regularly requested from the main memory disk 36 to be displayed on the TV screen. Again the disk may be temporarily busy for another operation. Data stored in the output buffer 35b is now supplied to the output 51b and thus applied to the output terminal 53 so as to enable continuity of viewing for the user. As soon as the disk is capable of supplying data, the data stored on the disk is supplied to the output 56 of the main memory 36 and applied to the input 59b of the output buffer memory 35b, for storage in the output buffer 35b.

[0027] In particular, the input buffer 35a is needed to buffer the incoming data while the disk is being read, and the output buffer 35b is needed to provide a continuous output of data while the disk is being written to. The input buffer 35a and the output buffer 35b are combined into one shared memory 35.

[0028] It will be shown that the input buffer part and the output buffer part in the buffer memory 35 can be realized using a FIFO or alternatively a reversible queue mechanism. These structures are now discussed.

[0029] Figure 3 shows a buffer memory, such as the input buffer memory 35a in the form of a FIFO. The output buffer memory has the same construction. Figure 3 shows basic FIFO queue control using a two-entry FIFO queue control block 60, including two pointer locations, the pointers stored in the locations pointing to the beginning and the end of the queue. The pointers in the control block 60 are set to some suitable constant such as zero to indicate an empty queue, see figure 3a. Memory blocks 51a, 52a, ..., 58a and 59a are chained in one direction. All memory blocks include a memory space 70 for storing the data and a pointer location 71, as indicated in the memory block 52a. The pointer P1 in the control block 60 points to the address where the memory block 59a is stored. As this memory block is the block lastly stored, its pointer has a constant value, such as zero. The pointer P2 in the control block 60 points to the address where the memory block 51a is stored. This memory block is the block containing the oldest information stored in the buffer memory. Its pointer points to

the address where the next memory block 52a is stored. The pointer 71 of the memory block 52a points to the address where the next memory block is stored. In this way, the pointer of block 58a points to the address where the block 59a is stored.

[0030] Memory blocks, such as the memory block 72, are added to the queue at the end of the chain. This is realized by setting P1 in control block 60 to the address where the memory block 72 is stored. Further, the pointer in memory block 72 becomes zero, and the pointer in memory block 59a will be set to the address where the memory block 72 is stored. Memory blocks, such as the memory block 51a, are taken from the queue at the start of the chain. This is realized by setting P2 in the control block 60 to the address where the memory block 52a is stored. In this way memory blocks can be added to and taken from the queue without the need to follow the whole chain of memory blocks. The pointer administration can be maintained in a short, fixed period of time.

[0031] A basic administration of the buffer memory 35 is possible using 3 FIFO queues, namely one FIFO queue (FIFO number 1) for the free memory blocks in the common buffer memory 35, one FIFO (FIFO number 2) for the input buffer memory part in the common buffer memory 35 and one FIFO (FIFO number 3) for the output buffer memory part of the common buffer memory 35.

[0032] A memory block is allocated for input by taking it from FIFO number 1 and adding it to FIFO number 2. A memory block is deallocated from input after its contents have been written to main memory 36 by taking it from FIFO number 2 and adding it to FIFO number 1. A memory block is allocated for output by taking it from FIFO number 1 and adding it to FIFO number 3. A memory block is deallocated from output after its data has been transferred to the output terminal 53 by taking it from FIFO number 3 and adding it to FIFO number 1. For this scheme to work properly, there must be adequate memory available in the buffer memory 35. It is important not to allow too much output memory to be allocated, as the amount of free memory for input will then be insufficient. The amount of memory needed, and the maximum amount of memory to ever be allocated to output data are mainly dependent on the seek time and data transfer time of the main memory 36.

[0033] The FIFO queue control blocks, such as the control block 60, can be located in fixed locations of working RAM 23 or the buffer memory 35.

[0034] Separate channels can be separately administered by defining one FIFO for free memory blocks and two FIFOs per channel (one for the input buffer part and one for the output buffer part, for each channel).

[0035] It may be possible to economise on memory by allowing the situation to occur exceptionally where there are no free memory blocks to allocate for input. In this case the most recently filled output buffer memory block is taken from FIFO number 3 and added to FIFO

number 1. An indication is set that in due course this data must be re-read from main memory 36. This process can be repeated if more input buffer memory blocks are needed. A snag is that in order to deallocate the most recent buffer in a FIFO queue as administered in Figure 3, the entire chain of memory blocks must be followed in order to find the most-recent-but-one memory block, which is to become the most recent memory block. This problem can be solved by using a reversible FIFO queue for the output buffer part, as illustrated in Figure 4. Reversible queues are an extension to the FIFO of figure 3, in that the memory blocks are linked in both directions. This enables a consistent queue administration to be maintained for use as FIFO (First-In First-Out) or LIFO (Last-In First-Out) without needing to follow the whole chain of pointers. For that purpose, the memory blocks include two pointer locations 71 and 73, for pointing towards a subsequent and a previous memory block respectively. The memory block 61 can again be the block including the oldest information, and the block 69 then comprises the most information most recently stored.

[0036] If the reference numerals in Figure 3 that carry an index 'a' are amended so as to carry an index 'b', the buffer memory of Figure 3 thus obtained describes the output buffer memory 35b.

Claims

1. An arrangement for intermediate storage of a video signal, said arrangement comprising: input means (50) for receiving sequential video signal elements at a first average speed; first-in-first-out input bridging buffer memory means (35a) having an input (59a) fed by said input means, having random access functionality for receiving said video signal elements and having an output interface (51a); mass memory disc means (36) having cross-track random access functionality for effecting said intermediate storage, and having write head means fed by said output interface (51a) and furthermore read head means; first-in-first-out output bridging buffer memory means (35b) having random access functionality and having an input interface (59b) fed by said read head means; output means (53) having an input fed by said first-in-first-out output bridging buffer memory means (35b) for outputting said sequential video signal elements at a second average speed; and wherein said input bridging buffer memory means and output bridging buffer memory means are exchangeably mapped on a single bridging buffer, for through said random access functionality and said cross-track random access functionality effecting an arbitrarily selectable intermediate storage time.
2. An arrangement as claimed in Claim 1, incorporated in a television receiver apparatus that has a video output for connection to a video recorder apparatus.
3. An arrangement as claimed in Claim 1, wherein said write head means and read head means are located in a single head.
4. An arrangement as claimed in Claim 1, wherein said mass memory disc means are magnetic and/or optical storage hard disc means.
5. An arrangement as claimed in Claim 1 wherein said input means are arranged for operating at a first average speed and said output means are arranged for then operating at a second average speed that is higher than said first average speed.
6. An arrangement as claimed in Claim 1 wherein said input means are arranged for operating at a first average speed and said output means are arranged for selectively operating at a second average speed that is either controllably higher or controllably lower than said first average speed.
7. An arrangement as claimed in Claims 5 or 6, wherein said second average speed corresponds to an appropriate human user viewing speed.
8. An arrangement as claimed in Claim 1, wherein said storage disc means allow current storage of at least a five minutes long stream of video signal elements.
9. An arrangement as claimed in Claim 1, wherein said input means, said output means and said mass memory disc means are arranged for accepting at least two independent streams of video signal elements in parallel.
10. An arrangement as claimed in Claim 1, wherein said input means and said mass memory disc means are arranged for accepting at least two independent streams of video signal elements in parallel.
11. An arrangement as claimed in Claim 1, combined with a supplementary video recording apparatus, wherein said output means are arranged for belatedly activating said video recording apparatus after said intermediate storage having commenced at an earlier instant.
12. An arrangement as claimed in Claim 1, combined with a video receiver apparatus and a video display apparatus, and being arranged for broadcaster-independent replay and/or slow-motion replay.
13. An arrangement as claimed in Claim 1 combined with a multi-channel video-receiver apparatus and

a supplementary single-channel video-recording apparatus, wherein said input means and said mass memory disc means are arranged for accepting at least two independent streams of video signal elements in parallel and said output means are arranged for belatedly activating said supplementary video recording apparatus with respect to a second channel after said intermediate storage having commenced at an earlier instant during overlap of said second channel with a first channel during the latter's being stored on said supplementary video recorder.

14. An arrangement as claimed in Claim 1 combined with a video-receiver apparatus and a video display apparatus, wherein said input means and said mass memory disc means are arranged for accepting a first stream of video signal elements in parallel to receiving at least a second independent stream of video signal elements next to said first stream of video signal elements by said video receiver apparatus, and said output means are arranged for belatedly activating said video display apparatus with respect to said first stream after said intermediate storage having commenced at an earlier instant during overlap of said first and second streams and said second stream's being displayed on said video display apparatus.
15. An arrangement as claimed in Claim 1 combined with a video-receiver apparatus and a video display apparatus, and for receiving a stream of video signal elements, and comprising inputting means for receiving an intermission control signal at a first particular time instant, and second inputting means for subsequently receiving a continue control signal at a second particular time instant, and said output means are arranged for belatedly activating said video display apparatus as from said second particular time instant on for displaying said stream of video signal elements as having been stored since said first particular time instant.

Patentansprüche

1. Anordnung zur unmittelbaren Speicherung eines Videosignals, wobei die genannte Anordnung umfaßt: Eingangsmittel (50) zum Empfangen sequentieller Videosignalelemente bei einer ersten mittleren Geschwindigkeit; FIFO-Eingangsüberbrückungspufferspeichermittel (35a), mit einem von den genannten Eingangsmitteln gespeisten Eingang (59a), mit der Funktionalität des wahlfreien Zugriffs zum Empfangen der genannten Videosignalelemente und mit einer Ausgangsschnittstelle (51a); Massenspeicherplattenmitteln (36) mit der Funktionalität des wahlfreien Querspurzugriffs zum Bewir-

ken der genannten Zwischenspeicherung und mit von der genannten Ausgangsschnittstelle (51a) gespeisten Schreibkopfmitteln und weiterhin Lesekopfmitteln; FIFO-Ausgangsüberbrückungspufferspeichermitteln (35b) mit der Funktionalität des wahlfreien Zugriffs und mit einer von den genannten Lesekopfmitteln gespeisten Eingangsschnittstelle (59b); Ausgangsmitteln (53) mit einem von den genannten FIFO-Ausgangsüberbrückungspufferspeichermitteln (35b) gespeisten Eingang zum Ausgeben der genannten sequentiellen Videosignalelemente bei einer zweiten mittleren Geschwindigkeit; und wobei die genannten Eingangsüberbrückungspufferspeichermittel und Ausgangsüberbrückungspufferspeichermittel austauschbar auf einen einzelnen Überbrückungspuffer abgebildet werden, um über die genannte Funktionalität des wahlfreien Zugriffs und die genannte Funktionalität des wahlfreien Querspurzugriffs eine willkürlich wählbare Zwischenspeicherdauer zu bewirken.

2. Anordnung nach Anspruch 1, aufgenommen in einem Fernsehgerät, das einen Videoausgang zum Anschluß an ein Videorecordergerät hat.
3. Anordnung nach Anspruch 1, wobei die genannten Schreibkopfmittel und Lesekopfmittel in einem einzigen Kopf liegen.
4. Anordnung nach Anspruch 1, wobei die genannten Massenspeicherplattenmittel Festplattenmittel zur magnetischen und/oder optischen Speicherung sind.
5. Anordnung nach Anspruch 1, wobei die genannten Eingangsmittel für einen Betrieb bei einer ersten mittleren Geschwindigkeit ausgebildet sind und die genannten Ausgangsmittel ausgebildet sind, um dann bei einer zweiten mittleren Geschwindigkeit zu arbeiten, die höher ist als die genannte erste mittlere Geschwindigkeit.
6. Anordnung nach Anspruch 1, wobei die genannten Eingangsmittel für einen Betrieb bei einer ersten mittleren Geschwindigkeit ausgebildet sind und die genannten Ausgangsmittel für einen selektiven Betrieb bei einer zweiten mittleren Geschwindigkeit ausgebildet sind, die entweder regelbar höher oder regelbar niedriger ist als die genannte erste mittlere Geschwindigkeit.
7. Anordnung nach Anspruch 5 oder 6, wobei die genannte zweite mittlere Geschwindigkeit einer geeigneten Betrachtungsgeschwindigkeit eines menschlichen Benutzers entspricht.
8. Anordnung nach Anspruch 1, wobei die genannten Speicherplattenmittel die laufende Speicherung zu-

mindest eines fünf Minuten langen Stroms aus Videosignalelementen zulassen.

9. Anordnung nach Anspruch 1, wobei die genannten Eingangsmittel, die genannten Ausgangsmittel und die genannten Massenspeicherplattenmittel ausgebildet sind, um zumindest zwei unabhängige Ströme von Videosignalelementen parallel zu akzeptieren.
10. Anordnung nach Anspruch 1, wobei die genannten Eingangsmittel und die genannten Massenspeicherplattenmittel ausgebildet sind, um zumindest zwei unabhängige Ströme von Videosignalelementen parallel zu akzeptieren.
11. Anordnung nach Anspruch 1, kombiniert mit einem zusätzlichen Videoaufnahmegerät, wobei die genannten Ausgangsmittel ausgebildet sind, um dieses Videorecordergerät spät zu aktivieren, nachdem die genannte Zwischenspeicherung zu einem früheren Zeitpunkt begonnen hat.
12. Anordnung nach Anspruch 1, kombiniert mit einem Videoempfangsgerät und einem Videowiedergabegerät und ausgebildet zum Rundfunkanbieterunabhängigen Abspielen und/oder zum Abspielen in Zeitlupe.
13. Anordnung nach Anspruch 1, kombiniert mit einem Mehrkanalvideoempfangsgerät und einem zusätzlichen Einkanalvideoaufnahmegerät, wobei die genannten Eingangsmittel und die genannten Massenspeicherplattenmittel ausgebildet sind, um zumindest zwei unabhängige Ströme von Videosignalelementen parallel zu akzeptieren und die genannten Ausgangsmittel ausgebildet sind, um dieses zusätzliche Videoaufnahmegerät in Bezug auf einen zweiten Kanal spät zu aktivieren, nachdem die genannte Zwischenspeicherung zu einem früheren Zeitpunkt während des Überlappens dieses zweiten Kanals mit einem ersten Kanal beim Speichern des letzteren auf dem genannten zusätzlichen Videorecorder begonnen hat.
14. Anordnung nach Anspruch 1, kombiniert mit einem Videoempfangsgerät und einem Videowiedergabegerät, wobei die genannten Eingangsmittel und die genannten Massenspeicherplattenmittel ausgebildet sind, um einen ersten Strom von Videosignalelementen zu akzeptieren, wobei parallel zumindest ein zweiter unabhängiger Strom von Videosignalelementen außer dem genannten ersten Strom von Videosignalelementen mit diesem Videoempfangsgerät empfangen wird, und die genannten Ausgangsmittel ausgebildet sind, um dieses Videowiedergabegerät in Bezug auf den genannten ersten Strom spät zu aktivieren, nachdem die ge-

nannte Zwischenspeicherung zu einem früheren Zeitpunkt während des Überlappens dieser ersten und zweiten Ströme begonnen hat und die genannten zweiten Ströme auf dem genannten Videowiedergabegerät wiedergegeben werden.

15. Anordnung nach Anspruch 1, kombiniert mit einem Videoempfangsgerät und einem Videowiedergabegerät und zum Empfangen eines Stroms von Videosignalelementen und mit Eingabemitteln zum Empfangen eines Intermissionssteuersignals zu einem ersten speziellen Zeitpunkt und zweiten Eingabemitteln zum anschließenden Empfangen eines kontinuierlichen Steuersignals zu einem zweiten speziellen Zeitpunkt, und wobei die genannten Ausgangsmittel ausgebildet sind, um das genannte Videowiedergabegerät von dem genannten zweiten speziellen Zeitpunkt an spät zu aktivieren, zur Wiedergabe des genannten Stroms aus Videosignalelementen, wie sie seit dem ersten speziellen Zeitpunkt gespeichert worden sind.

Revendications

1. Montage pour le stockage intermédiaire d'un signal vidéo, ledit montage comprenant : des moyens d'entrée (50) pour recevoir des éléments de signal vidéo séquentiels à une première vitesse moyenne; des premiers moyens de mémoire tampon de pontage premier entré, premier sorti (35a) comportant une entrée (59a) alimentée par lesdits moyens d'entrée, présentant une fonctionnalité d'accès direct pour recevoir lesdits éléments de signal vidéo et comportant une interface de sortie (51a); des moyens de disque de mémoire de masse (36) présentant une fonctionnalité d'accès direct transversale pour effectuer ledit stockage intermédiaire, et comportant des moyens de tête d'écriture alimentés par ladite interface de sortie (51a) et en outre des moyens de tête de lecture; des moyens de mémoire tampon de pontage de sortie premier entré, premier sorti (35b) présentant une fonctionnalité d'accès direct et comportant une interface d'entrée (59b) alimentée par lesdits moyens de tête de lecture; des moyens de sortie (53) comportant une entrée alimentée par lesdits moyens de mémoire tampon de pontage de sortie premier entré, premier sorti (35b) pour produire lesdits éléments de signal vidéo séquentiels à une deuxième vitesse moyenne; et dans lequel lesdits moyens de mémoire tampon de pontage d'entrée et lesdits moyens de mémoire tampon de pontage de sortie sont cartographiés de manière échangeable sur un seul tampon de pontage, pour, par le biais de ladite fonctionnalité d'accès direct et ladite fonctionnalité d'accès direct transversale, appliquer un temps de stockage intermédiaire pouvant être sélectionné de manière arbitraire.

2. Montage suivant la revendication 1, intégré dans un téléviseur qui comporte une sortie vidéo pour une connexion à un appareil d'enregistrement vidéo.
3. Montage suivant la revendication 1, dans lequel lesdits moyens de tête d'écriture et les moyens de tête de lecture sont situés dans une seule tête. 5
4. Montage suivant la revendication 1, dans lequel lesdits moyens de disque de mémoire de masse sont des moyens de disque dur de stockage magnétique et/ou optique. 10
5. Montage suivant la revendication 1, dans lequel lesdits moyens d'entrée sont agencés pour fonctionner à une première vitesse moyenne et lesdits moyens de sortie sont agencés pour fonctionner ensuite à une deuxième vitesse moyenne qui est supérieure à ladite première vitesse moyenne. 15
6. Montage suivant la revendication 1, dans lequel lesdits moyens d'entrée sont agencés pour fonctionner à une première vitesse moyenne et lesdits moyens de sortie sont agencés pour fonctionner de manière sélective à une deuxième vitesse moyenne qui est soit supérieure de manière commandable à ladite première vitesse moyenne ou inférieure de manière commandable à celle-ci. 20
7. Montage suivant la revendication 5 ou 6, dans lequel ladite deuxième vitesse moyenne correspond à une vitesse d'observation appropriée à un utilisateur humain. 25
8. Montage suivant la revendication 1, dans lequel lesdits moyens de disque de stockage permettent un stockage actuel d'au moins un flux d'éléments de signal vidéo de cinq minutes. 30
9. Montage suivant la revendication 1, dans lequel lesdits moyens d'entrée, lesdits moyens de sortie et lesdits moyens de disque de mémoire de masse sont agencés pour accepter au moins deux flux indépendants d'éléments de signal vidéo en parallèle. 35
10. Montage suivant la revendication 1, dans lequel lesdits moyens d'entrée et lesdits moyens de disque de mémoire de masse sont agencés pour accepter au moins deux flux indépendants d'éléments de signal vidéo en parallèle. 40
11. Montage suivant la revendication 1, combiné à un appareil d'enregistrement vidéo supplémentaire, dans lequel lesdits moyens de sortie sont agencés pour activer tardivement ledit appareil d'enregistrement vidéo après que ledit stockage intermédiaire a débuté à un moment antérieur. 45
12. Montage suivant la revendication 1, combiné à un appareil de réception vidéo et à un appareil d'affichage vidéo, et agencé pour une relecture indépendante de la station de diffusion et/ou une relecture au ralenti. 50
13. Montage suivant la revendication 1, combiné à un appareil de réception vidéo à plusieurs canaux et à un appareil d'enregistrement vidéo à un seul canal supplémentaire, dans lequel lesdits moyens d'entrée et lesdits moyens de disque de mémoire de masse sont agencés pour accepter au moins deux flux indépendants d'éléments de signal vidéo en parallèle et lesdits moyens de sortie sont agencés pour activer tardivement ledit appareil d'enregistrement vidéo supplémentaire par rapport à un deuxième canal après que ledit stockage intermédiaire a débuté à un moment antérieur durant le chevauchement entre ledit deuxième canal et un premier canal pendant le stockage de ce dernier sur ledit enregistreur vidéo supplémentaire. 55
14. Montage suivant la revendication 1, combiné à un appareil de réception vidéo et à un appareil d'affichage vidéo, dans lequel lesdits moyens d'entrée et lesdits moyens de disque de mémoire de masse sont agencés pour accepter un premier flux d'éléments de signal vidéo parallèlement à la réception d'au moins un deuxième flux d'éléments de signal vidéo indépendant à la suite dudit premier flux d'éléments de signal vidéo par ledit appareil de réception vidéo, et lesdits moyens de sortie sont agencés pour activer tardivement ledit appareil d'affichage vidéo par rapport audit premier flux après que le stockage intermédiaire a débuté à un moment antérieur pendant le chevauchement entre l'affichage desdits premier et deuxième flux sur ledit appareil d'affichage vidéo.
15. Montage suivant la revendication 1, combiné à un appareil de réception vidéo et à un appareil d'affichage vidéo, et pour recevoir un flux d'éléments de signal vidéo, et comprenant des moyens d'entrée pour recevoir un signal de commande d'interruption à un premier instant particulier, et des deuxième moyens d'entrée pour recevoir par la suite un signal de commande de continuation à un deuxième instant particulier, lesdits moyens de sortie étant agencés pour activer tardivement ledit appareil d'affichage vidéo à partir dudit deuxième instant particulier pour afficher ledit flux d'éléments de signal vidéo tel que stocké depuis ledit premier instant particulier.

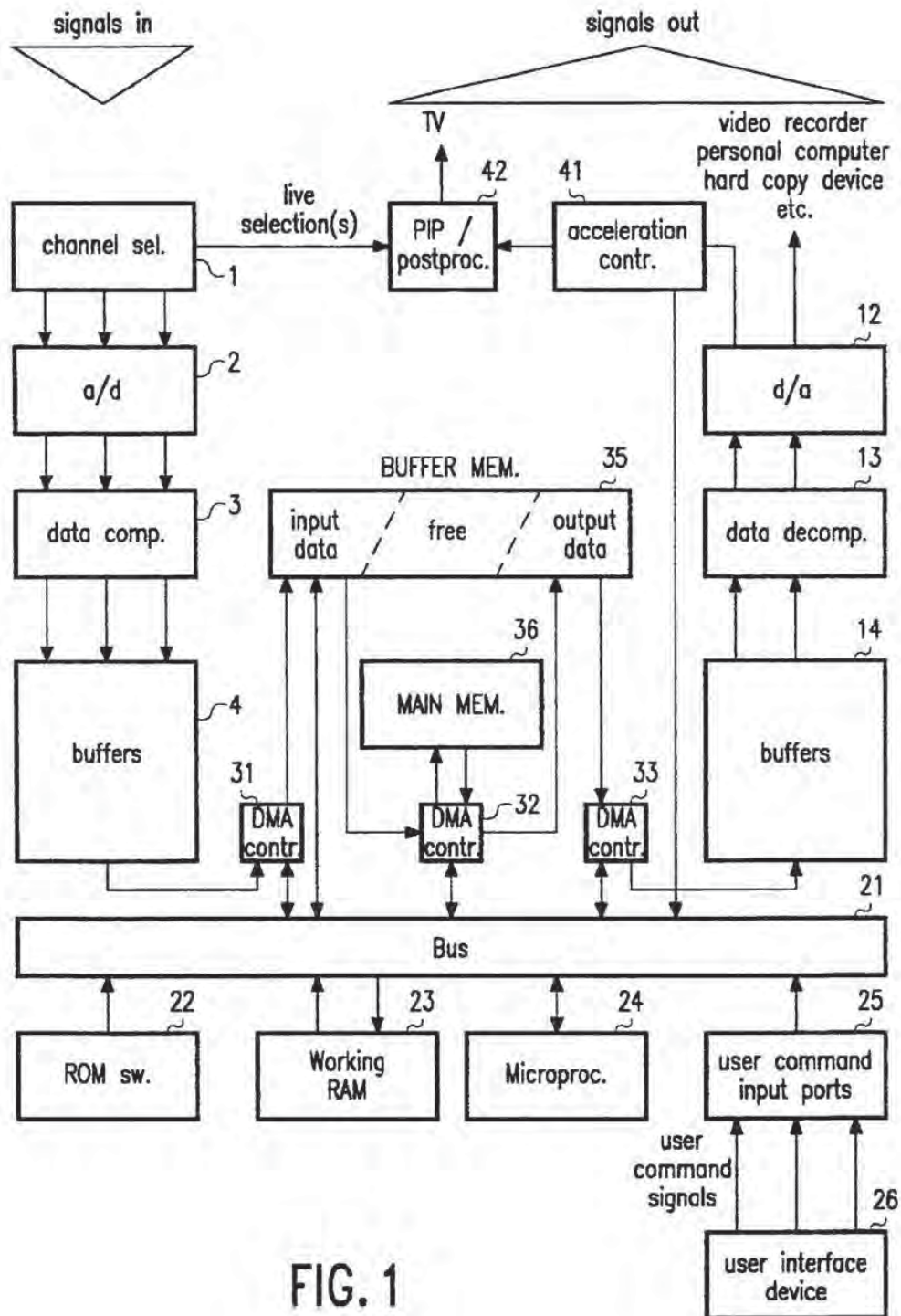
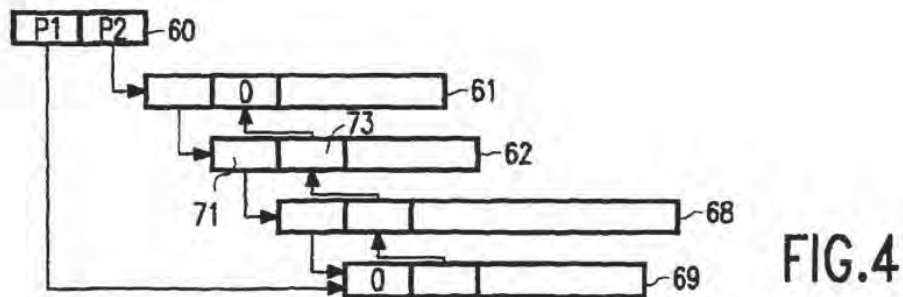
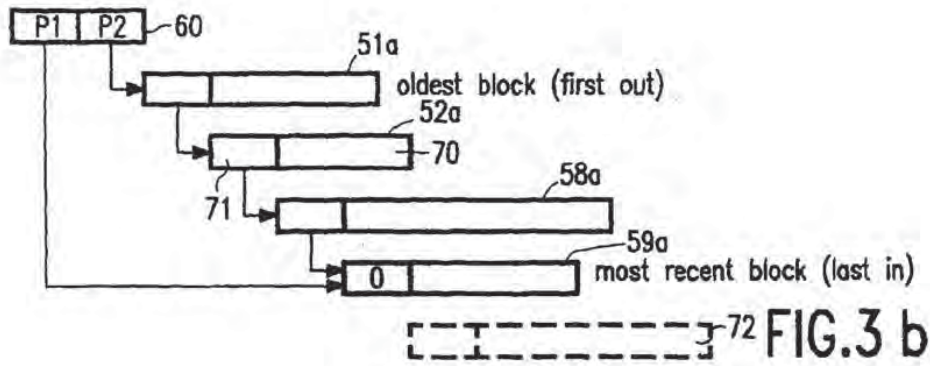
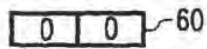
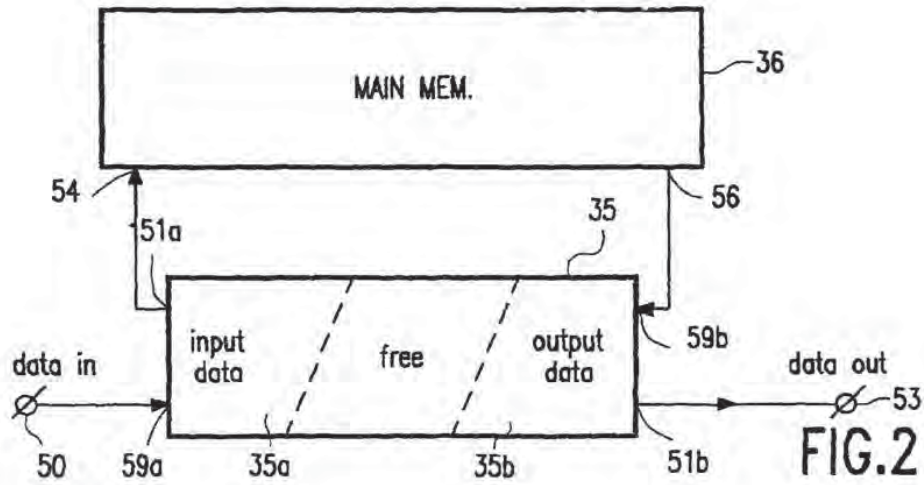


FIG. 1



(19)



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(54) **Video signal recording and reproducing apparatus**

Fernsehsignalaufnahme- und -wiedergabeanlage

Appareil d'enregistrement et de reproduction de signal vidéo

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Description

1. Field of the Invention:

[0001] The present invention relates to a video signal recording and reproducing apparatus which can simultaneously record and reproduce a video by using a disk apparatus.

2. Description of the Related Art:

[0002] A video tape recorder (VTR) has heretofore been used as a home-use video recording apparatus. As is well known, a VTR receives a broadcast program transmitted by a broadcasting station via an antenna, records the program and then reproduces the program. That is to say, having once finished the recording operation of a predetermined program, the VTR rewinds the tape on which the program has been recorded and then reproduces the received and recorded program to be watched.

[0003] A currently available VTR cannot record and reproduce a video simultaneously. For example, assuming that a broadcast program which starts at 10 o'clock and ends at 12 o'clock is now being received and recorded by a single VTR, it is impossible to reproduce and watch the broadcast program from the beginning from 11 o'clock on, while continuing receiving and recording the program. It is much less impossible to perform a trick play reproducing operation (e.g., a fast-forward reproducing operation or a backward reproducing operation) of a recorded video of a program which is now being received and recorded. On the other hand, a technique which is called "following reproducing operation" is currently utilized for a live broadcast relayed by a broadcasting station. In accordance with this technique, a video which has been transmitted to a broadcasting station is slightly delayed and then delivered substantially in real time. However, in such a case, it is necessary to use either a plurality of VTRs or an optical disk apparatus of a special type in which a recording head and a reproducing head are separately provided, for simultaneously performing the recording and the reproducing operations. If a plurality of VTRs are simultaneously used, then it becomes adversely complicated to operate these apparatuses. On the other hand, the use of such an optical disk apparatus of a special type disadvantageously increases the costs.

[0004] The document US-A-5 438 423 also discloses a video recording and reproducing apparatus which allows to reproduce a recorded video at a later time and at a desired rate. A video signal is continuously written into a random access dynamic buffer, such as an optical disk, in a recirculating manner, and may be read out on a random access basis.

SUMMARY OF THE INVENTION

[0005] Thus, the present invention concerns a video signal recording and reproducing apparatus as defined in the appended claims.

[0006] By utilizing the above-described configurations, it is possible to provide an apparatus which can independently perform a trick play reproducing operation (e.g., a fast-forward reproducing operation or a backward reproducing operation) of a recorded part of a broadcast program which is now being received, while compression encoding and recording the broadcast program. As a result, it is possible to start watching a recorded part of a program without waiting for the program to end as is done in the recording and reproducing operations performed by a conventional single VTR. In addition, even when a viewer initially starts watching a program at a time much later than the broadcast start time of the program, the viewer can finish watching the program substantially at the same time as the broadcast end time by additionally utilizing a fast-forward reproducing function in the middle of the reproducing operation.

[0007] According to the present invention, it is possible to provide an apparatus which can perform a normal reproducing operation or a trick play reproducing operation (e.g., a fast-forward reproducing operation or a backward reproducing operation) of a recorded part of a broadcast program which is now being received, while recording the broadcast program by using a universal hard disk apparatus without using a plurality of VTRs or an expensive optical disk apparatus for which a recording head and a reproducing head are separately provided. As a result, it is possible to start watching a recorded part of a program without waiting for the program to end, as is necessary in the recording and reproducing operations performed by a conventional single VTR. In addition, even when a viewer initially starts watching a program at a time much later than the broadcast start time of the program, the viewer can finish watching the program substantially at the same time as the broadcast end time by additionally utilizing a fast-forward reproducing function in the middle of the reproducing operation, so that a considerable amount of time can be saved. Moreover, in the case where a viewer cannot help stopping watching a program in the middle of the program, even if the program still continues when the viewer resumes watching the program, the viewer can reproduce and watch the program from the scene which was broadcast when the viewer left, while continuing recording the program. Furthermore, in the case where a viewer watches a first program while recording a second program on a different channel, it is possible to instantaneously

start watching the second program from the beginning thereof at a time after the first program ends and before the second program ends.

[0008] Thus, the invention described herein makes possible the advantage of providing a video signal recording and reproducing apparatus which can simultaneously record and reproduce a television signal.

[0009] This and other advantages of the present invention will become apparent to those skilled in the art upon reading and understanding the following detailed description with reference to the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Figure 1 is a block diagram illustrating a configuration for a video signal recording and reproducing apparatus in a first example of the present invention.

[0011] Figure 2 is a diagram illustrating an operational concept in the first example.

[0012] Figure 3 is a diagram illustrating the contents of a table RAM.

[0013] Figure 4 is a detailed timing chart of peripheral hardware for a hard disk apparatus.

[0014] Figure 5 is a block diagram illustrating a configuration for a video signal recording and reproducing apparatus in a fourth example of the present invention.

[0015] Figure 6 is a block diagram illustrating a configuration for a video signal recording and reproducing apparatus in a sixth example of the present invention.

[0016] Figure 7 is a diagram illustrating a screen synthesis in the sixth example of the present invention.

[0017] Figure 8 is a diagram illustrating a screen separation in the sixth example of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] Hereinafter, the embodiments of the present invention will be described with reference to the accompanying drawings.

Example 1

[0019] Figure 1 is a block diagram illustrating a configuration for a video signal recording and reproducing apparatus in a first example of the present invention. In Figure 1, the reference numeral 1 denotes an antenna; 2 denotes a tuner; 3 denotes a demodulator; 4 denotes an MPEG1 encoder; 5 and 6 denote recording buffer memories; 7 denotes a first switch; 8 denotes a hard disk apparatus; 9 and 10 denote reproducing buffer memories; 11 denotes a second switch; 12 denotes an MPEG1 decoder; 13 denotes a TV monitor; 14 denotes a hard disk controller; 15 denotes a table RAM; 16 denotes a system controller; 17 denotes a timer; and 18 denotes an operator panel.

[0020] First, before describing the operation of the apparatus in the first example with reference to Figure 1, the operational concepts will be described with reference to Figure 2. In this example, it is assumed that a viewer wants to watch a program which is to be broadcast from 10 p.m. to 12 p.m. (as shown in portion (a) of Figure 2) but that it is only after 11 p.m. that the viewer can watch the program because of some inconvenience. In such a case, in accordance with the method of this example, while recording the program from 10 p.m. to 12 p.m. (as shown in portion (b) of Figure 2), the viewer can start reproducing the program from the beginning thereof from 11 p.m. (as shown in portion (c) of Figure 2). When a normal reproducing mode is selected, the reproducing operation ends at 1 a.m. which is two hours later than the time when the viewer started watching the program. On the other hand, since a fast-forward reproducing operation can also be performed on a part of the program which has already been recorded as shown in portion (d) of Figure 2, it is also possible to reproduce all of the program at a time slightly later than 12 p.m., that is the time when the broadcasting of the program actually ends.

[0021] Hereinafter, a detailed operation of the video signal recording and reproducing apparatus of the first example will be described with reference to Figure 1. First, a viewer pre-sets a TV channel, a recording start time and a recording end time of a program to be watched on the operator panel 18. For example, it is assumed that the viewer sets a program on channel # 6 starting at 10 p.m. In such a case, when it is 10 p.m., the system controller 16 sets the tuner 2 to channel # 6 in accordance with the information supplied from the timer 17 such that the electric waves for the channel # 6 are selected from the electric waves received by the antenna 1, and the demodulator 3 demodulates the received waves into signals.

[0022] The received signals can be monitored on the TV monitor 13. The received signals are converted by the MPEG1 encoder 4 into compressed video signals so as to be bit streams having a bit rate of 1.5 Mbps. These signals are transmitted via the first and the second recording buffer memories 5 and 6 having a capacity of 200 Kbytes, for example, and the first switch 7 so as to be written onto the hard disk apparatus 8.

[0023] This operation will be described in detail later with reference to Figure 3. The sector information indicating the physical positions of the compressed video signals written on the hard disk and the time information of the written

signals are stored in the table RAM 15 so as to correspond to each other. Such a state is maintained until 11 p.m., when the viewer starts watching the program. When it is 11 p.m., the viewer starts watching the program on the TV monitor 13. In this case, if the viewer wants to watch the program starting at 10 p.m. (i.e., reserved recording start time) from the beginning thereof, then the viewer has only to push the reproducing button (not shown) on the operator panel 18.

[0024] In this case, the program starting at 10 p.m. is reproduced from the beginning thereof from 11 p.m. at a normal reproducing speed as shown in portion (c) of Figure 2. The hard disk controller 14 controls the hard disk apparatus 8 in accordance with the information supplied from the table RAM 15, so that the compressed video signals recorded on the hard disk apparatus 8 are reproduced via the reproducing buffer memories 9 and 10 and the second switch 11. This operation will be described in detail later with reference to Figure 3. The reproduced compressed video signals are decoded by the MPEG1 decoder 12 so as to be video signals which are displayed on the TV monitor 13.

[0025] It is noted that, in this example, the video signals compressed by the MPEG1 encoder 4 are being transmitted via the recording buffer memories 5 and 6 and the first switch 7 so as to be continuously written onto the hard disk apparatus 8 until 12 p.m. during the reproduction of the video signals. When it is 12 p.m., the system controller 16 finishes recording the compressed video signals onto the hard disk apparatus 8 in accordance with the information supplied from the timer 17. In this case, it is possible to monitor on the TV monitor 13, the video signals which are being written in parallel with the video signals which are being reproduced by using a technique such as a screen division.

[0026] On the other hand, in performing the reproducing operation, the viewer can reproduce a part of a program to be watched in detail at a slower speed and can reproduce an unnecessary part of the program at a higher speed in accordance with the instructions supplied from the system controller 16 by operating the operator panel 18. The correspondence between the sector information of the compressed video signals recorded on the hard disk, and the time information of the signals, has been stored in the table RAM 15 for performing these operations.

[0027] The format of this table is shown in Figure 3. In Figure 3, the reference numeral 19 denotes the time information represented as a time code and 20 denotes a sector number on the hard disk. In this example, since each of a plurality of successive sectors corresponds to one second, sector addresses are indicated every other second in Figure 3. In accordance with the operation of the viewer, the hard disk controller 14 reproduces required video signals based on this time information.

[0028] In the case of the MPEG1 standard, an image is generally compressed based on a unit consisting of a plurality of frames. A concept "GOP (group of pictures)" is used as the unit. For example, in the case where 1 GOP = 15 frames, 1 GOP covers a video corresponding to 0.5 second. Thus, in the case of performing a fast forward reproducing operation or a slow reproducing operation, if a decimation or an interpolation is performed on a GOP basis with respect to a video which has been decoded on a GOP basis, the resulting motion of the image is no longer smooth. In order to make the motion smooth, the decimation or the interpolation is required to be performed on a frame basis.

[0029] That is to say, a 10x fast-forward reproducing operation (or a fast-forward reproducing operation performed at a speed ten times as high as a normal reproducing speed) is realized by reproducing one frame out of ten frames. On the other hand, a 1/10x slow reproducing operation is realized by displaying one and the same frame 10 times in succession.

[0030] A time difference between the time when the video which is now being reproduced was recorded (hereinafter, such a time will be referred to as a "video recording time") and the current time, can be calculated by subtracting the video recording time, obtained by using the time information supplied from the table RAM 15, from the current time. If the time difference is displayed on the TV monitor 13, the time difference can be monitored. Before this time difference becomes zero, any arbitrary part of the video which has already been recorded can be reproduced. In addition, it is also possible to simultaneously display on the TV monitor 13 both the time corresponding to the output of the demodulator 3 and the time corresponding to the output of the MPEG1 decoder 12 by dividing the screen into two parts. Then, a video which is now being broadcast (and corresponds to the output of the demodulator 3) and a video which is now being reproduced (and corresponds to the output of the MPEG1 decoder 12) can be simultaneously watched on the same screen.

[0031] Assuming that the hard disk apparatus has a capacity large enough to record compressed video signals corresponding to two hours, if the viewer does not start watching a program within two hours after the recording start time, the recorded signals are updated from the point of time two hours later than the recording start time, whereby a program corresponding to two hours preceding the time when the viewer starts watching the recorded program can always be covered. On the other hand, an update halt mode may also be selected. In such a case, a video can only be recorded for two hours in the same way as a commonly used VTR.

[0032] Hereinafter, detailed timings of peripheral hardware of the hard disk apparatus 8 will be described with reference to Figure 4.

[0033] The detailed configuration of the hard disk apparatus 8 is omitted in Figure 1. A hard disk apparatus which is universally used as a peripheral device for a computer system can be used as the hard disk apparatus 8. The hard

disk apparatus **8** may include either one disk medium or a plurality of disk media and includes a recording and reproducing head, not a head exclusively used for a recording operation or a reproducing operation.

[0034] Portion (a) of Figure 4 represents an output of the MPEG1 encoder **4** and **A1**, **A2**, **A3**, ... **A6** indicate the signals obtained by dividing the output by every 1.5 Mbits. Portion (b) of Figure 4 represents the operational modes of the recording buffer memory **5** having a capacity of 200 Kbytes and **W** indicates writing a signal onto the memory and **R** indicates reading out a signal from the memory. Thus, **A1-W** means writing a signal **A1** onto the buffer memory and **A1-R** means reading out the signal **A1** from the buffer memory, for example. A signal is written onto the buffer memory in real time simultaneously with the video signals, while the signal is read out from the buffer memory at a high rate in accordance with the transfer rate at which the signal is transferred to the hard disk apparatus **8**.

[0035] Portion (c) of Figure 4 represents the operational modes of the recording buffer memory **6** having a capacity of 200 Kbytes and **W** and **R** indicate the same operations as those in portion (b). The buffer memories **5** and **6** operate in pairs. More specifically, while one of the buffer memories **5** or **6** transfers data to the hard disk apparatus **8** via the first switch **7**, the other buffer memory **6** or **5** stores therein a compressed video signal supplied from the MPEG1 encoder **4**.

[0036] Portion (d) of Figure 4 represents the seek timings for writing data onto the hard disk apparatus **8**. Portion (e) of Figure 4 represents the timings at which data is transferred from the buffer memories **5** and **6** to the hard disk apparatus **8** so as to be written thereon. **A1-W** means writing the signal **A1** onto the hard disk apparatus **8**. Though the time sequence is not specifically shown in Figure 4, portions (b) and (c) always precede portion (e). For example, the signal **A1** read out by **A1-R** in portion (b) is written by **A1-W** in portion (e).

[0037] Portion (f) of Figure 4 represents the seek timings for reading out data from the hard disk apparatus **8**. Portion (g) of Figure 4 represents the timings at which data is read out from the hard disk apparatus **8** and **B1-R** means reading out a signal **B1** from the hard disk apparatus **8**, for example. Portion (h) of Figure 4 represents the operational modes of the reproducing buffer memory **9** having a capacity of 200 Kbytes and **B1-W** means writing the signal **B1** onto the buffer memory **9**.

[0038] Portion (i) of Figure 4 represents the operational modes of the reproducing buffer memory **10** having a capacity of 200 Kbytes and **W** and **R** indicate the same operations as those described above. The buffer memories **9** and **10** operate in pairs. More specifically, while a signal read out from the hard disk apparatus **8** is written onto one of the buffer memories **9** or **10**, the other buffer memory **10** or **9** reads out a signal, which has been supplied from the hard disk apparatus **8** and stored in the buffer memory **10** or **9**, at a rate of the video signal and then supplies the signal to the MPEG1 decoder **12** via the second switch **11**.

[0039] Portion (j) of Figure 4 represents an input to the MPEG1 decoder **12**. As shown in Figure 4, the input has been extended so as to have the same period as that of the output in portion (a) and is continuously reproduced.

[0040] As shown in Figure 4, for recording and reproducing a video signal simultaneously and continuously, the period of each of the signals **A1**, **A2**, **A3**, ... is set to be longer than the following time T:

$$\begin{aligned}
 T = & \text{(seek time for preparing to record data onto the hard disk)} \\
 & + \text{(time required for writing the data having the} \\
 & \quad \text{period onto the hard disk)} \\
 & + \text{(seek time for preparing to reproduce the data from} \\
 & \quad \text{the hard disk)} \\
 & + \text{(time required for reading out the data having the} \\
 & \quad \text{period from the hard disk)}
 \end{aligned}$$

[0041] If the total of these times becomes longer than the period of **A1**, **A2**, **A3**, ..., then the video cannot be recorded but overflows. Thus, the period is required to be sufficiently longer than the total time. Since the seek time of the hard disk, in particular, largely varies depending upon situations, a maximum seek time is required to be estimated and included in the sum.

[0042] In this case, the period of **A1**, **A2**, **A3**, ... is a time during which an MPEG bit stream having a bit rate of 1.5 Mbps is occupied by a buffer memory having a capacity of 200 Kbytes: $200 \text{ k} \div (1.5 \text{ M} \div 8) = \text{about } 1 \text{ second}$. Assuming that the data transfer rate of the hard disk is 1 Mbyte per second, the time required for transferring the data is: $200 \text{ k} \div 1 \text{ M} = 0.2 \text{ second}$. Even when the maximum seek time is estimated to be 100 milliseconds,

$$T = 0.1 + 0.2 + 0.1 + 0.2 = 0.6 \text{ second} < 1 \text{ second}$$

Thus, a sufficient margin time can be obtained.

[0043] As described above, the video signal recording and reproducing apparatus according to the present invention is a video signal recording and reproducing apparatus using a hard disk which can simultaneously perform the recording and reproducing operations in different portions of the same hard disk. Thus, it is possible to provide an apparatus which can perform a trick play reproducing operation (e.g., a fast-forward reproducing operation or a backward reproducing operation) of a recorded part of a broadcast program which is now being recorded, while recording the broadcast program.

[0044] As a result, it is possible to start watching the recorded part of a program without waiting for the program to end, as is necessary in the recording and reproducing operations performed by a conventional single VTR. In addition, even when a viewer initially starts watching a program at a time much later than the broadcast start time of the program, the viewer can finish watching the program substantially at the same time as the broadcast end time by additionally utilizing a fast-forward reproducing function in the middle of the reproducing operation, so that a considerable amount of time can be saved.

[0045] Furthermore, though audio signal recording and reproducing sections are not shown in Figure 1, a sound accompanied with a video can be processed completely in the same way as the video. Therefore, the same description as applied to a "video" in this example is applicable to "video and sound".

[0046] It is noted that it is possible to perform the writing operation onto a hard disk only when it is necessary while a viewer watches a TV program for using the hard disk as long as possible. In such a case, a viewer starts a video recording operation by pushing an instruction button. A recording start button and a reproducing start button are provided for the operator panel 18 or a single button can be used for these two purposes. This function is effectively applicable to a case where a viewer cannot help stopping watching a TV program in the middle of the program for some unavoidable reason. For example, in the case where it becomes necessary to stop watching a TV program in the middle for receiving a visitor, responding to a telephone call, taking a bath or having a meal or the like, the viewer pushes the recording start button for recording the program from that point of time, settles his business and then pushes the reproducing start button. Thus, the recorded program is reproduced and the viewer can watch the program from the point of time when he started recording the program without missing any scene of the program. In addition, by providing an end setting button for allowing a viewer to set a recording end time easily, even if the viewer must go out suddenly and does not know exactly when he will be able to come home, the viewer can record a video for as long as he wants. Thus, the viewer can comfortably leave after he sets the hard disk in a writing state. In this case, if the end setting button is configured such that the recording time can be set depending upon how many times the viewer pushes the button (for example, one push of the button allows the program which is now being watched to be recorded for 30 minutes and two pushes of the button allows the program to be recorded for 1 hour), then the viewer can advantageously operate this apparatus very easily.

[0047] Since the program is continuously recorded during the reproduction of the program, the viewer can naturally watch the part of the program which is being broadcast during the reproduction.

[0048] In addition, a TV signal detector (not shown in Figure 1) for determining whether or not a TV broadcast is available or not is incorporated in the demodulator 3 shown in Figure 1. A synchronizing signal detector which is commonly provided for an existing TV receiver can be used as the TV signal detector and it is not necessary to additionally provide a novel circuit. Hereinafter, a case where a synchronizing signal detector is used as the TV signal detector will be specifically described.

[0049] First, it is determined whether or not a synchronizing signal exists in the demodulated video signal. If a synchronizing signal is absent in the demodulated video signal, then it is determined to be out of a broadcasting time, thereby protecting the hard disk apparatus from the writing operation. If the writing operation has already been started on the hard disk apparatus, the writing operation onto the hard disk apparatus is temporarily suspended at a point of time when the synchronizing signal is no longer detected and is resumed when the synchronizing signal is detected again. As a result, it is possible to avoid performing a recording operation in an undesired time period (e.g., a midnight time or the like when no broadcast is available), so that the lifetime of the hard disk apparatus can be lengthened. This function will be effective for avoiding performing an unnecessary recording operation at midnight when no broadcast is televised, supposing that a hard disk comes to have a recording capacity large enough to always record a televised video corresponding 24 hours preceding the current time in the near future. Since a synchronizing signal detector is commonly available well known circuit, the detailed description thereof will be omitted herein. A synchronizing signal detector of the type which integrates a synchronizing signal obtained from a well known synchronizing signal separator thereby determining whether or not the DC level thereof is a normalized value, or a synchronizing signal detector of the type which determines whether or not the frequency of the synchronizing signal is a predetermined value (e.g., the frequency of a horizontal synchronizing signal is 15.73 KHz in an NTSC standard) is used herein.

[0050] This example has been described while using a synchronizing signal detector as a TV signal detector. However, in the case where a digital broadcast is received, the TV signal can be detected by a method in which it is determined whether or not an error signal detected by an error signal detector, used for reproducing a clock for a PLL or the like, is at a predetermined level or by a method in which it is determined whether or not the amount of the error flag output from an error detector for correcting an error of a transmitted signal is at a predetermined level.

[0051] If a viewer continuously records a program and supplies a signal by the push of a button or the like for stopping watching the program such that the recording stop time, the address and the like are stored; then the viewer can naturally reproduce the program from the point of time when the viewer stopped watching the program by pushing the reproducing start button for resuming watching the program.

[0052] In addition, by additionally providing a second tuner and a second demodulator (though not shown in Figure 1), a channel to be watched and a channel to be recorded can be independently designated. For example, a case where a second program to be watched by a viewer starts on another channel while the viewer is watching a first program to be recorded will be assumed. In such a case, if the viewer starts to record the second program on the second channel, the viewer can watch the second program from the beginning thereof from the point of time when the first program which the viewer is watching ends.

Example 2

[0053] Hereinafter, a second example of the present invention will be described. Since the fundamental configuration in the second example is substantially the same as that in the first example shown in Figure 1, no drawings will be particularly referred to for describing the second example.

[0054] The video signal recording and reproducing apparatus of the second example is further provided with a circuit for inputting a video and/or a sound other than that of a broadcast (e.g., a reproduced signal of a VTR). If a part of a broadcast or desired video and/or sound input through the circuit is stored in the hard disk apparatus 8 for about 10 seconds and is automatically reproduced at a predetermined time every morning, the broadcast or the video and/or the sound can be used in place of an alarm clock so that a user can wake up comfortably.

[0055] It is noted that in such a case, the volume of the sound is required to be automatically adjusted to a sufficiently large volume, irrespective of a sound volume which was set the previous day. Furthermore, by additionally providing a speech recognition circuit for the apparatus shown in Figure 1, the apparatus can reproduce a predetermined video by recognizing the audible alarm of an alarm clock other than the clock incorporated in the system. Alternatively, by recognizing not an alarm but a speech pattern such as "I'm home" when a user comes home, the apparatus can reproduce a predetermined video by reading the video from the hard disk apparatus 8.

[0056] Furthermore, it is true that a user is required to perform complicated operations for designating his desired video and/or sound. However, if compressed video and/or sound are/is recorded in an inexpensive medium such as a floppy disk or a CD-ROM and the medium is put on the market, then the user can record his desired video and/or the sound onto the hard disk by connecting a reader for reading the video and/or sound from the medium to this apparatus. If the user reproduces the video and/or the sound at a predetermined time every morning, the user can receive a morning call of his favorite actor or the like. Thus, this apparatus can also be used as an instrument for making a user's life comfortable.

Example 3

[0057] Hereinafter, a third example of the present invention will be described. In this third example, the hard disk apparatus shown in Figure 1 has at least two recording regions. The first recording region of the hard disk apparatus 8 is a recording region in which the video signal received by the tuner 2 is recorded for realizing the function described in the second example. The second recording region of the hard disk apparatus 8 is a recording region for saving therein the video data which has arbitrarily been retrieved by a viewer from the video data recorded in the first recording region. As a result, the viewer can selectively save arbitrary information from a televised program in the second recording region while the viewer is watching the program.

[0058] For example, if only a scene of a travel program frequently televised recently, in which the address, the telephone number and the like of a hotel are displayed on the screen or the contents of a dish, a service or the like are presented, is selectively saved in the second recording region, the viewer can save such information more exactly without any need for taking notes. In addition, if the viewer applies a file name to the video data retrieved by himself and then stored in a prescribed directory, the viewer will be able to search for his desired file later more easily.

[0059] A specific example will be described below. For example, the second recording region of the hard disk is divided beforehand into a plurality of directories for "restaurants", "travel spots", "hotels" and the like. The directory of "hotels" can be further divided into a plurality of sub-directories of "restaurant hotels", "hot-spring hotels" and the like. A viewer performs an operation for designating a start point and an end point of a video to be saved while the viewer

is watching a program, and then selects a directory corresponding to the retrieved data. As a result, the video data is automatically saved in the selected directory. When the viewer searches for the video data later, the viewer will be able to find the video data by selecting his desired directory and the file name of the video data. If an external output terminal such as an SCSI interface is provided for the hard disk apparatus for storing the saved video data onto an external storage device such as a floppy disk drive or a PD drive, the viewer can produce his own database.

[0060] In this example, the hard disk apparatus is divided into two recording regions for simplifying the description. Alternatively, the same effects can also be attained by providing a circuit for designating whether the video data recorded on the hard disk is data which is to be automatically updated or data which is not updated unless the viewer commands the update. For example, the hard disk apparatus can be controlled by such a method that the type of recorded data, the sector information and the like are recorded in the table RAM 15 shown in Figure 1 and the hard disk controller 14 determines whether or not the respective sectors can be updated based on the information.

Example 4

[0061] Hereinafter, the fourth example of the present invention will be described with reference to Figure 5. In Figure 5, since the reference numerals 1 to 18 denote the same components as those having the same reference numerals in the first example, the description thereof will be omitted herein. In addition, since the reference numerals 9 to 26 correspond to and have the same configurations as the reference numerals 4 to 7 and 9 to 12 in Figure 5, respectively, the description thereof will also be omitted herein. In Figure 5, the reference numeral 27 denotes a frame decimator; 28 denotes a frame interpolator; and 29 denotes a third switch.

[0062] The hard disk apparatus 8 has at least two recording regions. The first recording region is a region in which the video signal received by the tuner 2 is recorded and which realizes the function described in the first example. Assuming that the first recording region has a capacity large enough to record compressed video signals corresponding to two hours, if the viewer does not start watching a program within two hours after the recording start time, the video data which was recorded previously is updated from the point of time, whereby a video corresponding to two hours preceding the time when the viewer starts watching the recorded video can always be watched as a normal video as already described in the first example.

[0063] In this example, when the video data is updated, the previously recorded video data is once read out, passed through the buffer memories 23 and 24; and then decoded by the decoder 26 into the original video signals. Then, a frame decimator 27 performs frame decimation processing with respect to these decoded video signals, thereby reducing the amount of data. The output of the frame decimator 27 is compressed again by the encoder 19. The compressed video signal, a part of the frames of which have been decimated in this way, are saved in the second recording region. The resulting recordable time is varied depending upon the method for decimating the frames. For example, assuming that the compression is performed by extracting one frame out of four frames, a recordable time four times as long as the recordable time in the case of recording a normally compressed video signal can be secured by using the same recording capacity. That is to say, when a hard disk apparatus having a recording capacity large enough to record data corresponding to 2.5 hours by a normal recording operation is used, the viewer can watch a broadcast preceding the recording start time by about four hours (i.e., two hours in the first recording region and two hours in the second recording region) and check the contents of the broadcast. As a result, the viewer can confirm a larger amount of the contents of the programs while using a smaller recording capacity. In other words, while reducing the required minimum recording capacity of a hard disk apparatus, it is also possible to meet the viewer's demand for recording a video as long as possible.

[0064] It is natural that the audio signals recorded in the second recording region are normally recorded without performing a decimation operation on a frame basis. When the video signals recorded in the second recording region are read out to be displayed on the TV monitor 13, the output of the decoder 12 shown in Figure 5 is once input to the frame interpolator 28, where the decimated frames are interpolated by the same frames and the interpolated signals are passed through the third switch 29 so as to be displayed on the TV monitor 13. In this example, a frame decimation method is used for reducing the amount of video data. Alternatively, various other methods such a sampling method and a color difference signal elimination method can also be used.

[0065] In this example, the hard disk apparatus is divided into two recording regions for simplifying the description. However, a circuit for applying information for identifying whether the video data recorded on the hard disk is data composed of normally recorded video signals, or data having a reduced amount of data by a frame decimation or the like to the video data recorded on the hard disk, and saving the data including the identifiers on the hard disk, may be provided. For example, it is possible to utilize a method in which the type of recorded data, the sector information and the like are recorded in the table RAM 15 shown in Figure 5 and the hard disk controller 14 controls the hard disk apparatus 8 based on the information.

[0066] In addition, the viewer can independently set a time period during which a video signal is normally recorded and a time period during which data is recorded after the amount of the data is reduced by a frame decimation or the

like. As a result, the viewer can utilize the apparatus of the invention so as to satisfy his own preferences more completely.

Example 5

[0067] Hereinafter, the fifth example of the present invention will be described. Since the fundamental configuration used in this example is the same as that shown in Figure 1, there are no drawings exclusively used for describing this example. If a plurality of (i.e., a number N of) tuners having the same configuration as the tuner 2 shown in Figure 1 are provided, a plurality of video signals can be simultaneously received. A number N of encoders 4 may be provided. Alternatively, if an encoder of the type operating at an encoding rate N times as high as a normal encoding rate is used, then it is possible to use the encoder by switching it depending upon the time.

[0068] If a number N of hard disk apparatuses having the same configuration as that of the hard disk apparatus 8 shown in Figure 1 are used in parallel; if the reading and writing rates from/onto the hard disk apparatus 8 are set to be higher while using a single hard disk apparatus 8 in the same way as in Figure 1; or if the period A1, A2, A3, ... or the capacity of the buffer memories is increased such that the time T_N required for reading and writing in the N channels becomes shorter than the period, then it is possible to read out a video on a desired channel while simultaneously writing videos on the N channels. By realizing this function, a viewer can select his desired another TV channel after a TV program on a channel to be watched is finished without designating the another channel beforehand.

Example 6

[0069] Hereinafter, the sixth example of the present invention will be described with reference to Figure 6. In Figure 6, since the reference numerals 1 to 18 denote the same components as those having the same reference numerals in the first example, the description thereof will be omitted herein.

[0070] In Figure 6, the reference numeral 30 denotes a screen synthesizer; 31 denotes a screen separator; and 32 denotes a pixel interpolator. In this example, by providing a plurality of (e.g., four in Figure 6) tuners 2 and demodulators 3, a plurality of video signals can be simultaneously received. The received video signals are input to the screen synthesizer 30. The screen synthesizer 30 matches the phases of the synchronizing signals of the respective video signals by using frame memories (not shown) and then reduces the sizes of the screens corresponding to the respective video signals by performing a pixel decimation, a line decimation and the like, thereby synthesizing the screens having reduced sizes into one screen as shown in Figure 7. A composite video signal obtained by synthesizing the video signals in the above-described manner is compressed by the encoder 4 and then recorded onto the hard disk apparatus 8 in the same way as in the first example. In performing a reproducing operation, the screen separator 31 extracts only the portion corresponding to the desired channel from the synthesized screen and the pixel interpolator 32 performs a pixel interpolation and a line interpolation on the extracted portion for enlarging the size of the portion to that of a normal screen and then displays the video on the TV monitor 13, as shown in Figure 8. Figure 8 is a diagram illustrating an operation of retrieving only the video in the desired channel from the reproduced video. As a result, videos on a larger number of TV channels can be recorded in the hard disk apparatus 8 having the same recording capacity as that of a conventional one. In addition, by reading out a video on a desired channel while simultaneously writing videos on the N channels, a viewer can select his desired another TV channel after a TV program on a channel to be watched is finished without designating the another channel beforehand. Furthermore, in this sixth example, it is not necessary to use an N-times-larger recording capacity for recording the videos in the N channels, unlike the third example, so that it is effectively possible to save the recording capacity of the hard disk apparatus.

[0071] It is naturally possible to directly display the composite video signal output from the decoder 12 without performing a screen separation.

[0072] In the foregoing examples, a recording format (or a relationship between a GOP unit and a sector unit on the hard disk, in particular) has not been specifically described. However, in view of the case of performing a trick-play reproducing operation such as a fast-forward reproducing operation, it is preferable to utilize a format in which a simple relationship is established between a GOP and a sector. For example, a format in which one GOP consists of a number K of sectors; a format in which one sector consists of a number M (where K and M are integers) of GOPs; a format in which a number K of sectors correspond to a number M of GOPs; or the like can be used.

[0073] In addition, if the hard disk apparatus of the present invention is configured as a hard disk apparatus having a removable drive portion which is currently used as a peripheral device for a personal computer, then the hard disk apparatus of the present invention can be advantageously used for forming a backup file of video data, saving particular video data and the like.

[0074] Various other modifications will be apparent to and can be readily made by those skilled in the art without departing from the scope of this invention. Accordingly, it is not intended that the scope of the claims appended hereto be limited to the description as set forth herein, but rather that the claims be broadly construed.

Claims

1. An apparatus for recording a video signal including a plurality of frames onto a hard disk apparatus and reproducing the video signal recorded onto the hard disk apparatus, comprising:

input means (1, 2, 3) inputting a video signal;
 compression means (4) for compressing an amount of information per a unit of M frames of the input video signal so as to output a compressed video signal;
 time compression means (5, 6) for compressing an amount of time per a unit of N* M frames of the compressed video signal along a time axis so as to obtain a compressed video writing signal;
 writing means for writing the compressed video writing signal onto a plurality of different portions of the hard disk apparatus via a magnetic head, each of the plurality of different portions having successive L sectors, N* M frames of the compressed video writing signal being written onto the successive L sectors;
 reading means for reading an arbitrary compressed video writing signal, which was previously written onto the plurality of different portions of the hard disk apparatus, from the hard disk apparatus via the magnetic head to obtain a compressed video reading signal;
 time decompression means (9, 10) for decompressing an amount of time per a unit of N* M frames of the compressed video reading signal along the time axis so as to obtain a decompressed video signal for reproduction;
 decoding means (12) for decompressing an amount of information per a unit of M frames of the decompressed video signal for reproduction; and
 control means for controlling the writing means and the reading means such that a period during which the compressed video writing signal is written onto the hard disk apparatus does not overlap with a period during which the compressed video reading signal is read from the hard disk apparatus, where L, M and N each is an integer greater than or equal to 1,
 wherein a period for the compressed video signal which is output from the compression means is set to be longer than a time T,

where the time T is defined as a sum of the seek time required for moving the magnetic head to write the compressed video writing signal onto the hard disk apparatus, the time required for writing the compressed video writing signal onto the hard disk apparatus, the seek time required for moving the magnetic head to read the compressed video reading signal from the hard disk apparatus, and the time required for reading the compressed video reading signal from the hard disk apparatus.

2. An apparatus according to claim 1, wherein the input means further inputs an audio signal.
3. An apparatus according to claim 1, wherein the M frames of the input video signal corresponds to one GOP.
4. An apparatus according to claim 1, wherein the compressed video writing signal which is written onto the hard disk apparatus at an earlier time is updated by a newly obtained compressed video writing signal.
5. An apparatus according to claim 1, further comprising instruction means (18) for starting and/or finishing recording a video signal onto the hard disk apparatus.
6. An apparatus according to claim 5, wherein the instruction means for starting recording a video signal onto the hard disk apparatus is driven manually.
7. An apparatus according to claim 5, wherein the instruction means for starting recording a video signal onto the hard disk apparatus is driven by timer means.
8. An apparatus according to claim 5, wherein the instruction means for finishing recording a video signal onto the hard disk apparatus is driven by timer means.
9. An apparatus according to claim 1, further comprising instruction means (18) for starting and/or finishing reproducing the recorded video signal from the hard disk apparatus.
10. An apparatus according to claim 9, wherein the instruction means for starting reproducing the recorded video signal from the hard disk apparatus is driven manually.

11. An apparatus according to claim 1, further comprising display means (12) for displaying the decompressed video signal.
- 5 12. An apparatus according to claim 11, wherein the display means further displays a time difference between a time at which a video signal is being reproduced was recorded and a current time.
13. An apparatus according to claim 11, wherein the display means further displays a time at which a video signal which is being reproduced was recorded and a current time.
- 10 14. An apparatus according to claim 11, wherein the display means further displays the input video signal and an output of the decoding means, simultaneously.
- 15 15. An apparatus according to claim 3, further comprising operation means (18) for selectively setting one of a normal reproduction mode, a fast forward reproduction mode, a backward reproduction mode and a slow reproduction mode as a reproduction mode.
- 20 16. An apparatus according to claim 15, further comprising frame decimation means for decimating a frame from decoded video signal decoded from GOP signal which is reproduced from the hard disk apparatus when the operation means sets one of the fast forward reproduction mode and the backward reproduction mode.
- 25 17. An apparatus according to claim 15, further comprising frame interpolation means (28) for interpolating a frame from decoded video signal decoded from GOP signal which is reproduced from the hard disk apparatus when the operation means sets the slow reproduction mode.
- 30 18. An apparatus according to claim 1, further comprising television signal detection means for detecting a normal television signal as the video signal input by the input means, wherein the writing of the compressed video writing signal onto the hard disk apparatus is enabled only when the television signal detection means has detected the normal television signal.
- 35 19. An apparatus according to claim 1, further comprising speech recognition means for recognizing a speech, wherein the control means controls the reading means such that a predetermined compressed video reading signal is read from the hard disk apparatus in response to the recognition of the speech.
- 40 20. An apparatus according to claim 1, wherein the control means controls the writing means such that a part of the compressed video writing signal is selected and written onto the hard disk apparatus with information for prohibiting overwriting data onto the hard disk apparatus in response to an input from a user.
- 45 21. An apparatus according to claim 20, wherein the selected part of the compressed video writing signal is accompanied with information which is used to search the selected part of the compressed video writing signal during reproduction.
22. An apparatus according to claim 20, wherein the control means further controls transfer of the selected part of the compressed video writing signal to another apparatus.
- 50 23. An apparatus according to claim 1, further comprising a decimating means for decimating a part of the reproduced video signal, wherein the compression means compresses the amount of information per a unit of M frames of the decimated reproduced video signal.
- 55 24. An apparatus according to claim 1, wherein the input means inputs a plurality of video signals from a plurality of channels, the compression means compresses the amount of information per a unit of M frames of each of the plurality of video signals input from the plurality of channels so as to output the compressed video signal.
25. An apparatus according to claim 1, wherein the input means inputs a plurality of video signals from a plurality of channels, the apparatus further comprises a synthesis means (30) for synthesizing the plurality of video signals input from the plurality of channels into a synthesized signal, the compression means compresses the amount of information per a unit of M frames of the synthesized signal.
26. An apparatus according to claim 1, wherein the input means inputs a plurality of video signals from a plurality of

channels.

Patentansprüche

1. Videosignalaufnahmeanlage mit einer Vielzahl von Bildern auf einer Festplattenvorrichtung und einer Wiedergabeanlage zur Wiedergabe des auf der Festplattenvorrichtung gespeicherten Videosignals, mit

Eingabemitteln (1, 2, 3) zur Eingabe eines Videosignals;

Kompressionsmitteln (4) zur Kompression einer Menge von Informationen pro einer Einheit von M Bildern des Eingabe-Videosignals, um ein komprimiertes Videosignal auszugeben;

Zeit-Kompressions-Mitteln (5,6) zur Kompression einer Zeitspanne pro einer Einheit von N*M Bildern des komprimierten Videosignals entlang einer Zeitachse, um ein komprimiertes Video-Schreib-Signal zu erhalten;

Schreibmitteln zum Schreiben des komprimierten Video-Schreib-Signals auf eine Vielzahl von verschiedenen Abschnitten der Festplattenvorrichtung mittels eines magnetischen Kopfes, wobei jeder der vielen verschiedenen Abschnitte aufeinanderfolgende L Sektoren besitzt und N*M Bilder des komprimierten Video-Schreib-Signals auf die aufeinanderfolgenden L Sektoren geschrieben werden;

Lesemitteln zum Lesen eines beliebigen, komprimierten Video-Schreib-Signals, welches vorher auf die Vielzahl von verschiedenen Abschnitten der Festplattenvorrichtung geschrieben wurde, von der Festplattenvorrichtung mittels des magnetischen Kopfes, um ein komprimiertes Video-Lese-Signal zu erhalten;

Zeit-Dekompressionsmittel n(9, 10) zur Dekompression einer Zeitspanne pro einer Einheit von N*M Bildern des komprimierten Video-Lese-Signals entlang einer Zeitachse, um ein dekomprimiertes Videosignal zur Wiedergabe zu erhalten;

Decodier-Mitteln (12) zur Dekompression einer Menge von Informationen pro einer Einheit von M Bildern des dekomprimierten Videosignals zur Wiedergabe;

und Steuermitteln zur Steuerung der Schreibmittel und der Lesemittel in einer Weise, dass eine Periode, während der das komprimierte Video-Schreib-Signal auf die Festplattenvorrichtung geschrieben wird, sich nicht mit einer Periode überschneidet, in der das komprimierte Video-Lese-Signal von der Festplattenvorrichtung gelesen wird, wobei L, M und N jeweils eine ganze Zahl grösser oder gleich 1 sind,

worin eine Periode für das komprimierte Videosignal, welches von den Kompressionsmitteln ausgegeben wird, länger als eine Zeit T gesetzt wird;

wobei die Zeit T definiert wird als eine Summe der Suchzeit, die benötigt wird, um den magnetischen Kopf zum Schreiben des komprimierten Video-Schreib-Signals auf die Festplattenvorrichtung hin zu bewegen, der Zeit, die benötigt wird zum Schreiben des komprimierten Video-Schreib-Signals auf die Festplattenvorrichtung, der Suchzeit, die benötigt wird, um den magnetischen Kopf zum Lesen des komprimierten Video-Lese-Signals von der Festplattenvorrichtung weg zu bewegen, und der Zeit, die benötigt wird zum Lesen des komprimierten Video-Lese-Signals von der Festplattenvorrichtung.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingabemittel zusätzlich ein Audio-Signal eingeben,

3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die M Bilder des Eingabe-Video-Signals einem GOP entsprechen.

4. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das komprimierte Video-Schreib-Signal, welches zu einem früheren Zeitpunkt auf die Festplattenvorrichtung geschrieben wird, durch ein neu erhaltenes, komprimiertes Video-Schreib-Signal aktualisiert wird.

5. Vorrichtung nach Anspruch 1, weiters mit Anweisungsmitteln (18) zum Starten und/oder Beenden der Aufzeichnung eines Videosignals auf die Festplattenvorrichtung.
- 5 6. Vorrichtung nach Anspruch 5,
dadurch gekennzeichnet, dass
die Anweisungsmittel zum Starten der Aufzeichnung eines Videosignals auf die Festplattenvorrichtung manuell betrieben werden.
- 10 7. Vorrichtung nach Anspruch 5,
dadurch gekennzeichnet, dass
die Anweisungsmittel zum Starten der Aufzeichnung eines Videosignals auf die Festplattenvorrichtung durch einen Timer betrieben werden.
- 15 8. Vorrichtung nach Anspruch 5,
dadurch gekennzeichnet, dass
die Anweisungsmittel zum Beenden der Aufzeichnung eines Videosignals auf die Festplattenvorrichtung durch einen Timer betrieben werden.
- 20 9. Vorrichtung nach Anspruch 1, weiters mit Anweisungsmitteln (18) zum Starten und/oder Beenden der Wiedergabe des aufgezeichneten Videosignals von der Festplattenvorrichtung.
- 25 10. Vorrichtung nach Anspruch 9,
dadurch gekennzeichnet, dass
die Anweisungsmittel zum Starten der Wiedergabe des aufgezeichneten Videosignals von der Festplattenvorrichtung manuell betrieben werden.
- 30 11. Vorrichtung nach Anspruch 1,
gekennzeichnet durch
Darstellungsmittel (12) zur Darstellung des dekomprimierten Videosignals.
- 35 12. Vorrichtung nach Anspruch 11,
dadurch gekennzeichnet, dass
die Darstellungsmittel zusätzlich eine Zeitdifferenz zwischen einer Zeit, zu der das wiedergegebene Videosignal aufgenommen wurde, und einer aktuellen Zeit anzeigen.
- 40 13. Vorrichtung nach Anspruch 11,
dadurch gekennzeichnet, dass
die Darstellungsmittel zusätzlich eine aktuelle Zeit und eine Zeit, zu der das wiedergegebene Videosignal aufgenommen wurde, anzeigen.
- 45 14. Vorrichtung nach Anspruch 11,
dadurch gekennzeichnet, dass
die Darstellungsmittel zusätzlich das Eingabe-Videosignal und eine Ausgabe der Decodier-Mittel gleichzeitig anzeigen.
- 50 15. Vorrichtung nach Anspruch 3, weiters mit Anwendungsmitteln (19) zur selektiven Auswahl eines Wiedergabe-Modus aus einem normalen Wiedergabe-Modus, einem schnellen Wiedergabe-Modus, einem Rückwärts-Wiedergabe-Modus und einem Zeitlupen-Wiedergabe-Modus.
- 55 16. Vorrichtung nach Anspruch 15, weiters mit Bild-Dezimierungs-Mitteln zur Dezimierung eines Bildes aus einem decodierten Videobild, decodiert aus einem GOP-Signal, welches von der Festplattenvorrichtung wiedergegeben wird, wenn die Anwendungsmittel einen der beiden Modi, schneller Wiedergabe-Modus und Rückwärts-Wiedergabe-Modus, einstellen.
17. Vorrichtung nach Anspruch 15, weiters mit Interpolations-Mitteln (28) zur Interpolation eines Bildes aus einem decodierten Videobild, decodiert aus einem GOP-Signal, welches von der Festplattenvorrichtung wiedergegeben wird, wenn die Anwendungsmittel den Zeitlupen-Wiedergabe-Modus einstellen.

18. Vorrichtung nach Anspruch 1, weiters mit Fernseh-Signal-Erkennungs-Mitteln zur Erkennung eines normalen Fernseh-Signals als die Video-Signal-Eingabe durch die Eingabemittel, worin das Schreiben des komprimierten Video-Schreib-Signals auf die Festplattenvorrichtung nur dann ermöglicht wird, wenn die Fernseh-Signal-Erkennungs-Mittel das normale Fernseh-Signal erkannt haben.

19. Vorrichtung nach Anspruch 1, weiters mit Spracherkennungs-Mittel zur Erkennung von Sprache, worin die Steuermittel die Lesemittel so steuern, dass ein vorbestimmtes komprimiertes Video-Lese-Signal von der Festplattenvorrichtung als Antwort auf die Erkennung der Sprache gelesen wird.

20. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuermittel die Schreibmittel so steuern, dass ein Teil des komprimierten Video-Schreib-Signals ausgewählt und mit Information auf die Festplattenvorrichtung geschrieben wird, zur Verhinderung eines Überschreibens von Daten auf der Festplattenvorrichtung als Antwort auf eine Eingabe von einem Benutzer.

21. Vorrichtung nach Anspruch 20, **dadurch gekennzeichnet, dass** der ausgewählte Teil des komprimierten Video-Schreib-Signals begleitet wird von Information, welche verwendet wird, um den ausgewählten Teil des komprimierten Video-Schreib-Signals während der Wiedergabe zu suchen.

22. Vorrichtung nach Anspruch 20, **dadurch gekennzeichnet, dass** die Steuermittel zusätzlich die Übertragung des ausgewählten Teils des komprimierten Video-Schreib-Signals zu einer anderen Vorrichtung steuern.

23. Vorrichtung nach Anspruch 1, weiters mit Dezimierungs-Mitteln zur Dezimierung eines Teils des wiedergegebenen Video-Signals, worin die Kompressionsmittel die Menge an Information pro Einheit von M Bildern des dezimierten wiedergegebenen Video-Signals komprimieren.

24. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingabemittel eine Vielzahl von Video-Signalen von einer Vielzahl von Kanälen eingeben, die Kompressionsmittel die Menge an Information pro Einheit von M Bildern von jeder der Vielzahl von Video-Signal-Eingaben aus der Vielzahl von Kanälen komprimieren, um das komprimierte Video-Signal auszugeben.

25. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingabemittel eine Vielzahl von Video-Signalen von einer Vielzahl von Kanälen eingeben, die Vorrichtung zusätzlich Synthese-Mittel (30) zur Synthese der Vielzahl von Video-Signal-Eingaben von einer Vielzahl von Kanälen in ein synthetisiertes Signal und die Kompressionsmittel die Menge an Information pro Einheit von M Bildern des synthetisierten Signals komprimieren.

26. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eingabemittel eine Vielzahl von Video-Signalen von einer Vielzahl von Kanälen eingeben.

Revendications

1. Dispositif destiné à enregistrer un signal vidéo comprenant une pluralité de trames sur un dispositif de disque dur et à reproduire le signal vidéo enregistré sur le dispositif de disque dur, comprenant :

un moyen d'entrée (1, 2, 3) destiné à recevoir en entrée un signal vidéo,
un moyen de compression (4) destiné à compresser une certaine quantité d'informations par unité de M trames du signal vidéo d'entrée de façon à fournir en sortie un signal vidéo compressé,
un moyen de compression de temps (5, 6) destiné à compresser une quantité de temps par unité de N*M trames du signal vidéo compressé suivant l'axe des temps de façon à obtenir un signal d'écriture compressé,
un moyen d'écriture destiné à écrire le signal d'écriture vidéo compressé sur une pluralité de parties différentes

du dispositif de disque dur par l'intermédiaire d'une tête magnétique, chaque partie de la pluralité de parties différentes comportant L secteurs successifs, N*M trames du signal d'écriture vidéo compressé étant écrites sur les L secteurs successifs,

un moyen de lecture destiné à lire un signal d'écriture vidéo compressé quelconque, qui a été écrit précédemment sur la pluralité de parties différentes du dispositif de disque dur, à partir du dispositif de disque dur par l'intermédiaire de la tête magnétique afin d'obtenir un signal de lecture vidéo compressé,

un moyen de décompression de temps (9, 10) destiné à décompresser une quantité de temps par unité de N*M trames du signal de lecture vidéo compressé le long de l'axe des temps de façon à obtenir un signal vidéo décompressé en vue d'une reproduction,

un moyen de décodage (12) destiné à décompresser une certaine quantité d'informations par unité de M trames du signal vidéo décompressé en vue d'une reproduction, et

un moyen de commande destiné à commander le moyen d'écriture et le moyen de lecture de sorte qu'un intervalle de temps durant lequel le signal d'écriture vidéo compressé est écrit sur le dispositif de disque dur ne chevauche pas une période durant laquelle le signal de lecture vidéo compressé est lu à partir du dispositif de disque dur, où L, M et N représentent chacun un nombre entier supérieur ou égal à 1,

dans lequel une période pour le signal vidéo compressé qui est fourni en sortie à partir du moyen de compression est établie pour être plus longue qu'un temps T,

où le temps T est défini comme étant une somme du temps de recherche nécessaire pour déplacer la tête magnétique en vue d'écrire le signal d'écriture vidéo compressé sur le dispositif de disque dur, le temps requis pour écrire le signal d'écriture vidéo compressé sur le dispositif de disque dur, le temps de recherche nécessaire pour déplacer la tête magnétique afin de lire le signal de lecture vidéo compressé à partir du dispositif de disque dur, et le temps requis pour lire le signal de lecture vidéo compressé à partir du dispositif de disque dur.

2. Dispositif selon la revendication 1, dans lequel le moyen d'entrée reçoit en outre en entrée un signal audio.
3. Dispositif selon la revendication 1, dans lequel les M trames du signal vidéo d'entrée correspondent à un groupe GOP.
4. Dispositif selon la revendication 1, dans lequel le signal d'écriture vidéo compressé qui est écrit sur le dispositif de disque dur à un instant antérieur est mis à jour par un signal d'écriture vidéo compressé nouvellement obtenu.
5. Dispositif selon la revendication 1, comprenant en outre un moyen d'instruction (18) destiné à lancer et/ou terminer l'enregistrement d'un signal vidéo sur le dispositif de disque dur.
6. Dispositif selon la revendication 5, dans lequel le moyen d'instruction destiné à lancer l'enregistrement d'un signal vidéo sur le dispositif de disque dur est commandé manuellement.
7. Dispositif selon la revendication 5, dans lequel le moyen d'instruction destiné à lancer l'enregistrement d'un signal vidéo sur le dispositif de disque dur est commandé par un moyen de temporisateur.
8. Dispositif selon la revendication 5, dans lequel le moyen d'instruction destiné à terminer l'enregistrement d'un signal vidéo sur le dispositif de disque dur est commandé par un moyen de temporisateur.
9. Dispositif selon la revendication 1, comprenant en outre un moyen d'instruction 18 destiné à lancer et/ou terminer la reproduction du signal vidéo enregistré à partir du dispositif de disque dur.
10. Dispositif selon la revendication 9, dans lequel le moyen d'instruction destiné à lancer la reproduction du signal vidéo enregistré à partir du dispositif de disque dur est commandé manuellement.
11. Dispositif selon la revendication 1, comprenant en outre un moyen d'affichage (12) destiné à afficher le signal vidéo décompressé.
12. Dispositif selon la revendication 11, dans lequel le moyen d'affichage affiche en outre une différence de temps entre un temps auquel un signal vidéo qui est en cours de reproduction a été enregistré et un temps actuel.
13. Dispositif selon la revendication 11, dans lequel le moyen d'affichage affiche en outre un temps auquel un signal vidéo qui est en cours de reproduction a été enregistré et un temps actuel.

14. Dispositif selon la revendication 11, dans lequel le moyen d'affichage affiche en outre le signal vidéo d'entrée et une sortie du moyen de décodage, simultanément.
- 5 15. Dispositif selon la revendication 3, comprenant en outre un moyen d'actionnement (18) destiné à établir sélectivement l'un des modes de reproduction normale, d'un mode de reproduction à avance rapide, d'un mode de reproduction en arrière et d'un mode de reproduction lente en tant que mode de reproduction.
- 10 16. Dispositif selon la revendication 15, comprenant en outre un moyen de décimation de trame destiné à décimer une trame à partir d'un signal vidéo décodé, qui est décodé à partir d'un signal GOP qui est reproduit à partir du dispositif de disque dur lorsque le moyen d'actionnement établit l'un des mode de reproduction à avance rapide et mode de reproduction en arrière.
- 15 17. Dispositif selon la revendication 15, comprenant en outre un moyen d'interpolation de trame (28) destiné à interpoler une trame à partir d'un signal vidéo décodé, qui est décodé à partir du signal GOP qui est reproduit à partir du dispositif de disque dur lorsque le moyen d'actionnement établit le mode de reproduction lent.
- 20 18. Dispositif selon la revendication 1, comprenant en outre un moyen de détection de signal de télévision destiné à détecter un signal de télévision normal en tant que signal vidéo reçu en entrée par le moyen d'entrée, dans lequel l'écriture du signal d'écriture vidéo compressé sur le dispositif de disque dur n'est permise que lorsque le moyen de détection de signal de télévision a détecté le signal de télévision normal.
- 25 19. Dispositif selon la revendication 1, comprenant en outre un moyen de reconnaissance de la parole destiné à reconnaître de la parole, dans lequel le moyen de commande commande le moyen de lecture de manière à ce qu'un signal de lecture vidéo compressé soit lu à partir du dispositif de disque dur en réponse à la reconnaissance de la parole.
- 30 20. Dispositif selon la revendication 1, dans lequel le moyen de commande commande le moyen d'écriture de telle sorte qu'une partie du signal d'écriture vidéo compressé soit sélectionnée et écrite sur le dispositif de disque dur avec des informations destinées à interdire l'écrasement des données sur le dispositif de disque dur en réponse à une entrée provenant d'un utilisateur.
- 35 21. Dispositif selon la revendication 20, dans lequel la partie sélectionnée du signal d'écriture vidéo compressé est accompagnée d'informations qui sont utilisées pour rechercher la partie sélectionnée du signal d'écriture vidéo compressé durant une reproduction.
- 40 22. Dispositif selon la revendication 20, dans lequel le moyen de commande commande en outre le transfert de la partie sélectionnée du signal d'écriture vidéo compressé vers un autre dispositif.
- 45 23. Dispositif selon la revendication 1, comprenant en outre un moyen de décimation destiné à décimer une partie du signal vidéo reproduit, dans lequel le moyen de compression compresse la quantité d'informations par unité de M trames du signal vidéo reproduit décimé.
- 50 24. Dispositif selon la revendication 1, dans lequel le moyen d'entrée reçoit en entrée une pluralité de signaux vidéo provenant d'une pluralité de canaux, le moyen de compression compresse la quantité d'informations par unité de M trames de chaque signal de la pluralité de signaux vidéo reçus en entrée depuis la pluralité de canaux de façon à fournir en sortie le signal vidéo compressé.
- 55 25. Dispositif selon la revendication 1, dans lequel le moyen d'entrée reçoit en entrée une pluralité de signaux vidéo depuis une pluralité de canaux, le dispositif comprend en outre un moyen de synthèse (30) destiné à synthétiser la pluralité de signaux vidéo reçus en entrée depuis la pluralité de canaux en un signal synthétisé, le moyen de compression compresse la quantité d'informations par unité de M trames du signal synthétisé.
26. Dispositif selon la revendication 1, dans lequel le moyen d'entrée reçoit en entrée une pluralité de signaux vidéo depuis une pluralité de canaux.

FIG. 1

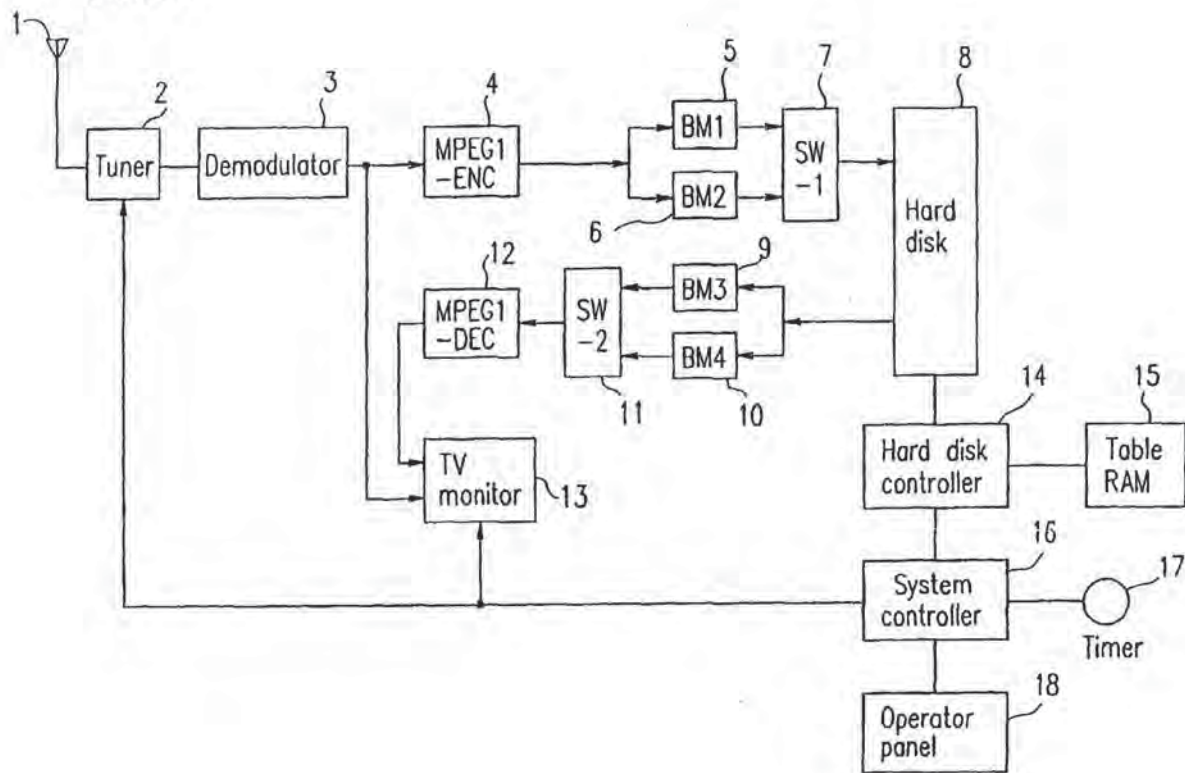


FIG. 2

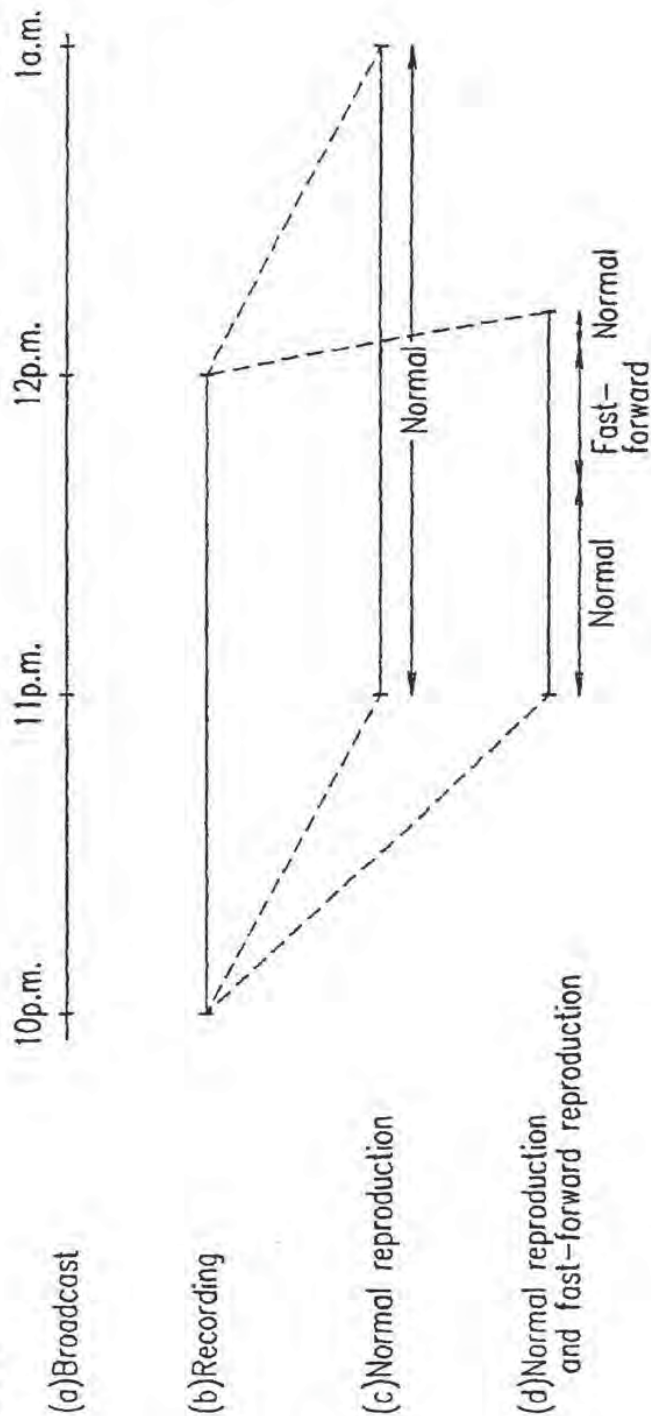


FIG. 3

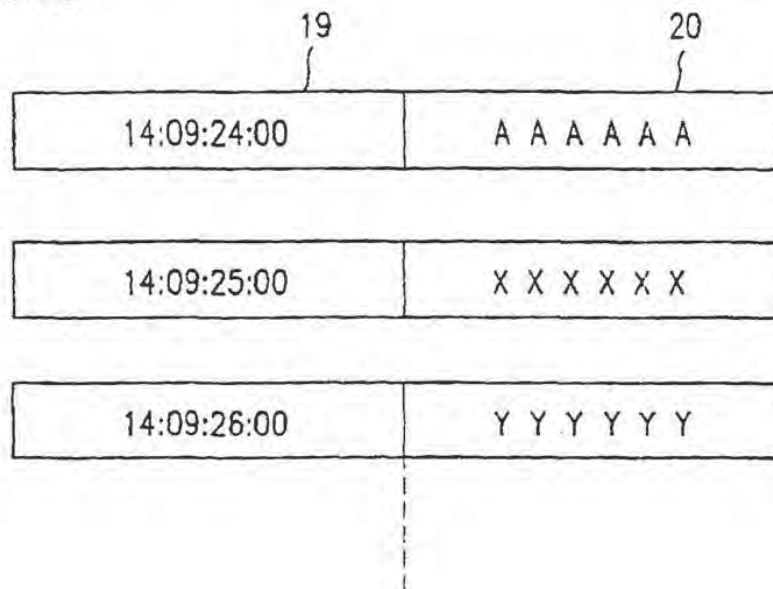


FIG. 4

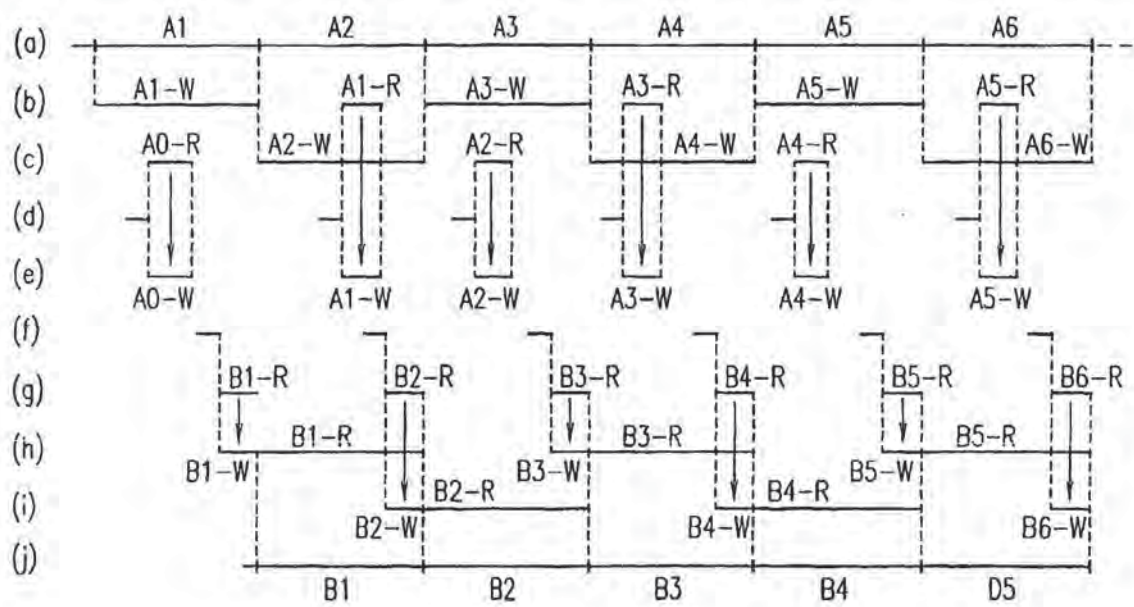


FIG. 5

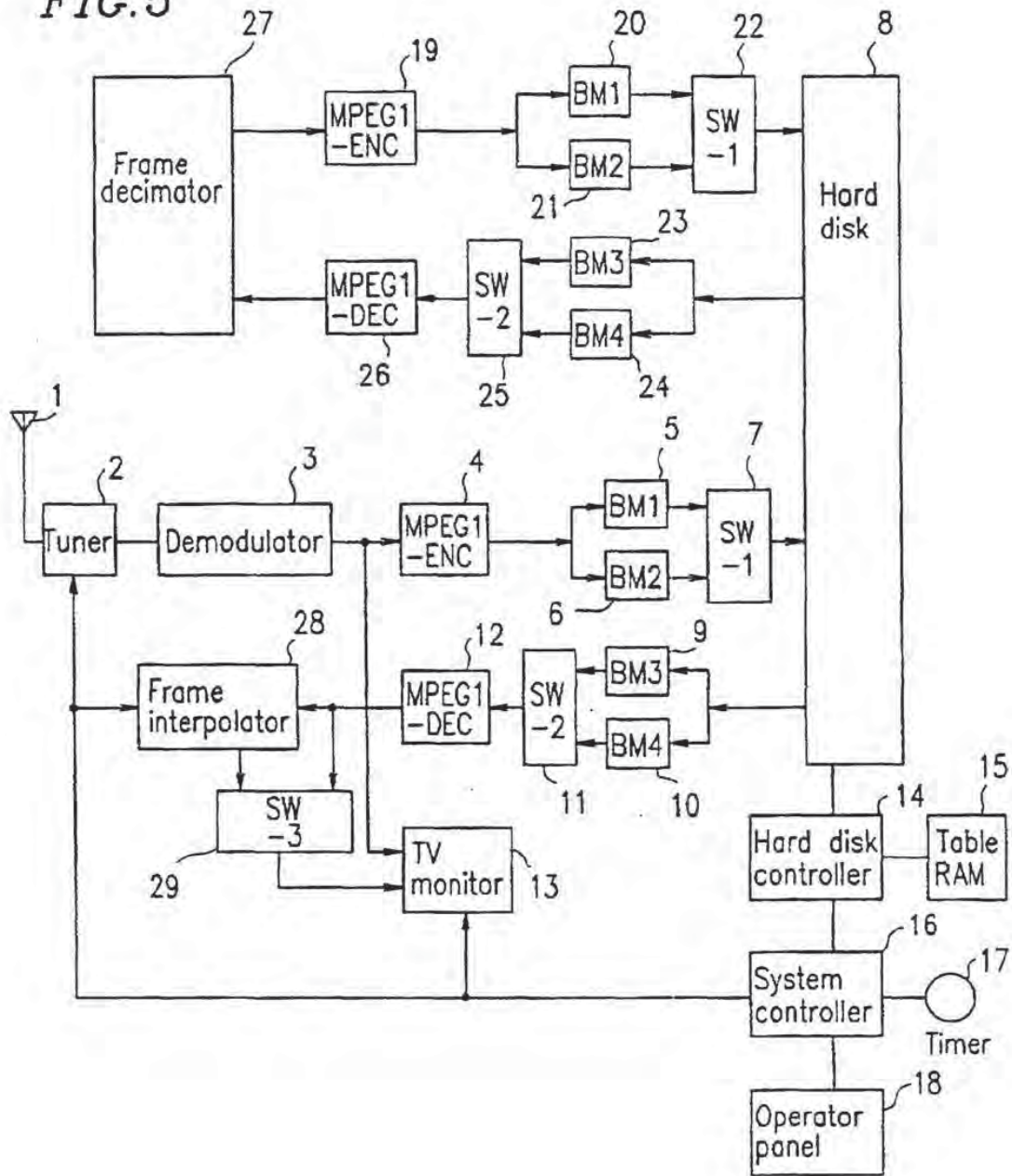


FIG. 6

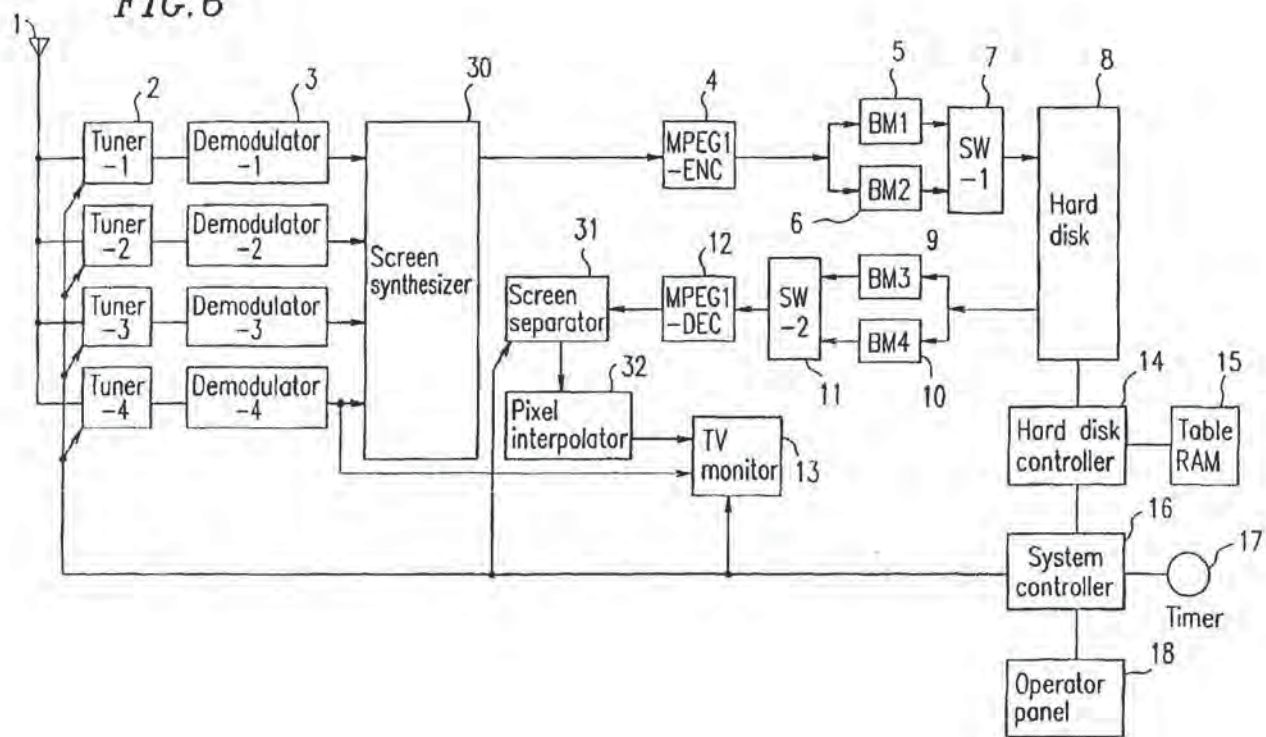


FIG. 7

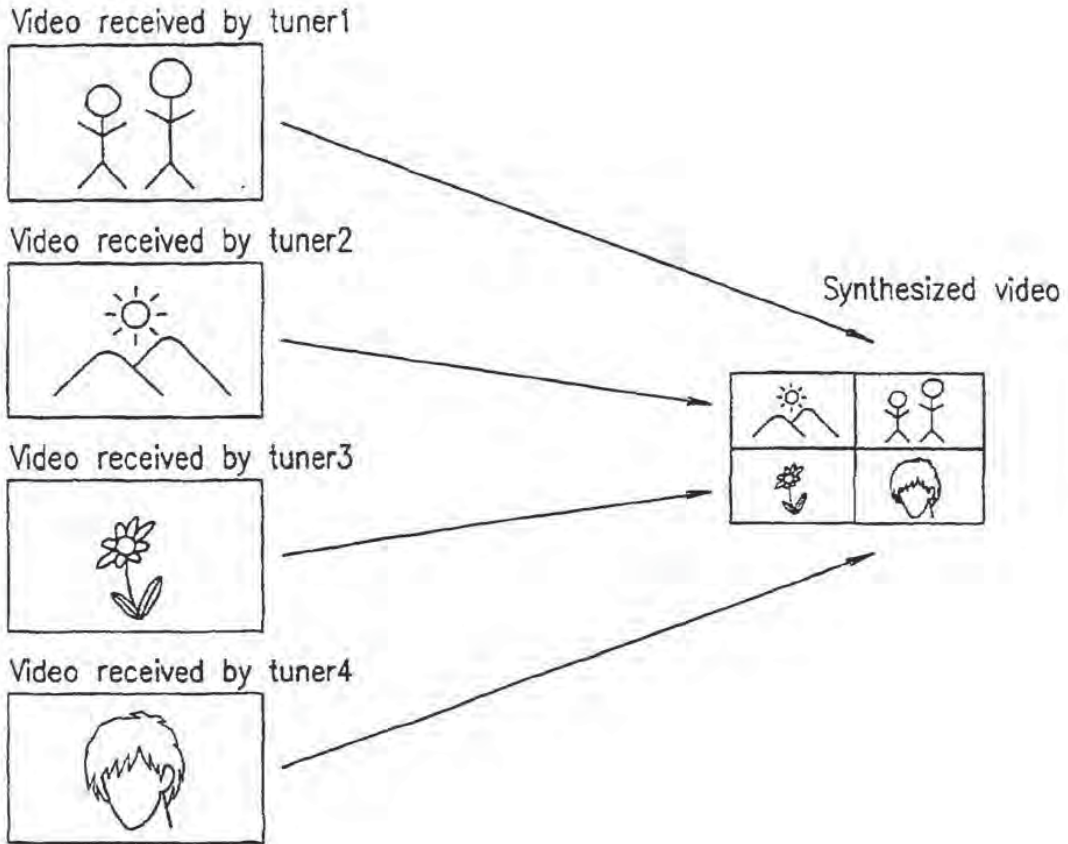


FIG. 8

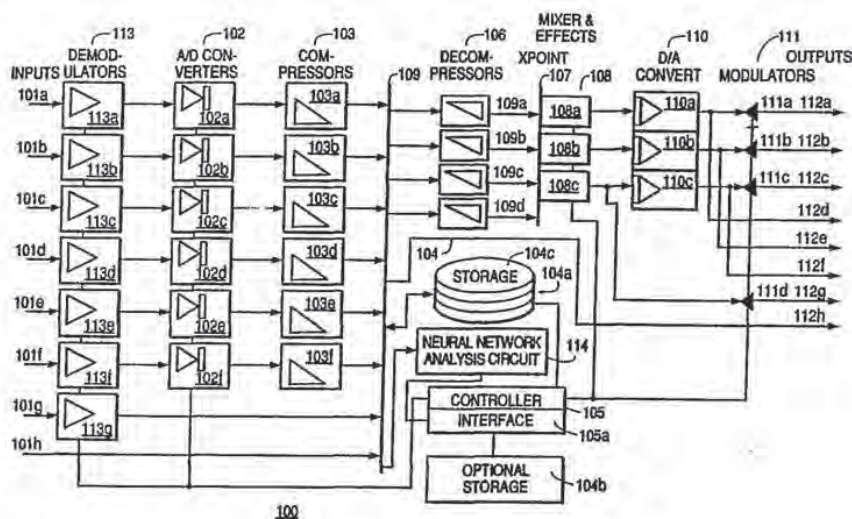




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(57) Abstract

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

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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;

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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.

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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

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buffer 104c causes only selected desired programming to be stored in storage section 104 and listed in the stored program list 600. 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 600. 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

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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

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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 programing with patterns of interest to the user, the programing 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.

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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

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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

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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 310c. 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

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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,

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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

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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.

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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

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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

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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

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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.

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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.

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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

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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

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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.

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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.

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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.

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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.

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.

- 37 -

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

- 38 -

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.

- 39 -

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.

- 40 -

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.

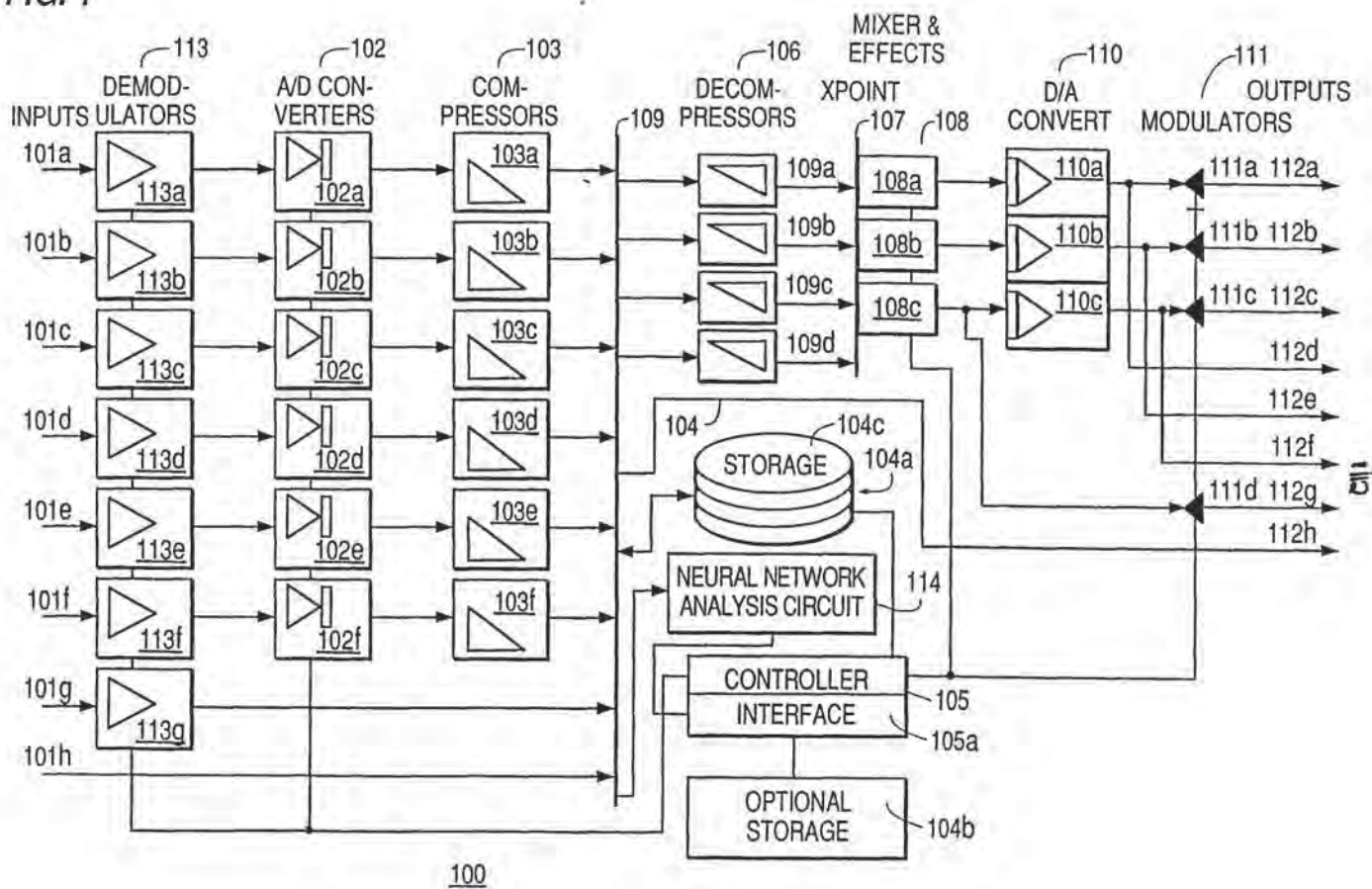
37. The audio/video routing device of claim 33 further including an output port, wherein the routing means includes means for routing the digital signals to the output port.

38. The audio/video routing device of claim 37 wherein the routing means includes voice activation means for controlling the routing means.

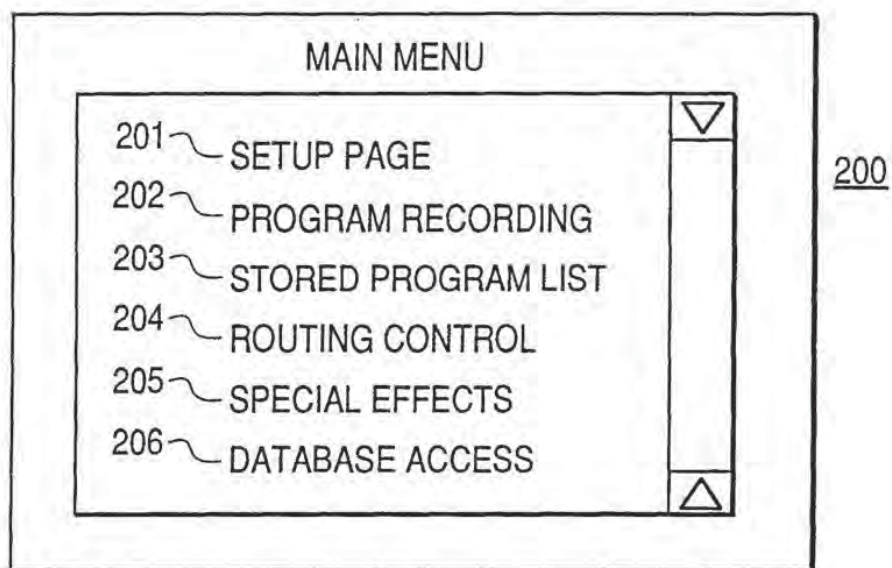
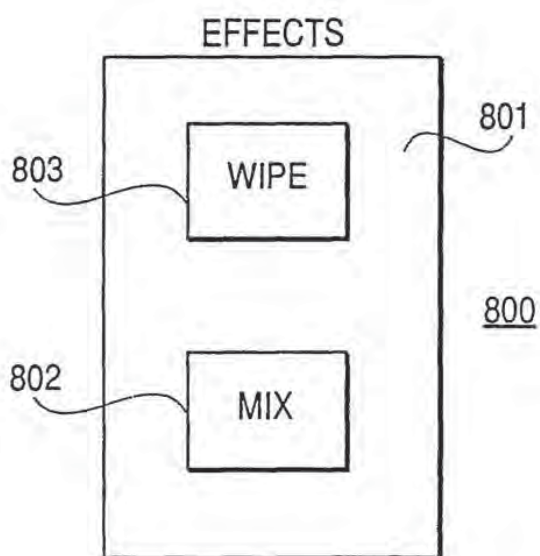
- 41 -

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



211a

FIG. 2**FIG. 8**

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FIG. 3

300

VIDEO CONTROL DISPLAY ON OUTPUTS 1 ☒ 2 ☐ 3 ☒ AUDIO CONTROL VOICED ON OUTPUTS 1L ☒ 1R ☒ 2L ☐ 2R ☐ 3L ☐ 3R ☐										
<u>PROGRAM ERASURE</u> 301 ☐ ERASE OLDEST PROGRAMS (FIFO) ☐ ERASE OLDEST VIEWED PROGRAMS ☐ ERASE ONLY SELECTED PROGRAMS										
<u>OUTPUT CONTROL SETUP</u> 302 <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	<u>PROGRAM DISPLAY MODES</u> ☐ WINDOWED ~ 304a SELECT OUTPUT ☐ TILED ~ 304b ☐ 1 ~ 112a ☐ FULL SCREEN ~ 304c ☐ 2 ~ 112b ☐ 3 ~ 112c
OUTPUT 1	TV WIRELESS	312								
OUTPUT 2	PANASONIC VHS	322								
OUTPUT 3	CONTROL L	332								
<u>SET RECORDING CRITERIA</u> 303 ☐ MONITOR VIEWER ~ 303a ☐ MONITOR "INTERESTING" + "UNINTERESTING" BUTTONS ~ 303b ☐ OFF ~ 303c	<u>AUTO RECORDING STORAGE ALLOCATION</u> 305 									

312

4/1a

FIG. 4B

JUNE							400
SUN	MON	TUE	WED	THU	FRI	SAT	402
	1	2	3	4	5	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. 4A

1990				401
JAN	FEB	MAR		
APR	MAY	JUN		
JUL	AUG	SEP		

FIG. 4C

SAT JUNE 5th		403
AM		
1		
2		
3		
4		
5		
6		
7	X	
8		
9.0		
PM		
1		
2		
3		
4		
5		
6		
7		
8		

SUBSTITUTE SHEET

5112

FIG. 5A

ENTER CHANNEL 501

FIG. 5B

SELECT SOURCE 502

- ☒ CABLE
- ☐ ANTENNA VHF
- ☐ ANTENNA UHF
- ☐ FM RADIO
- ☐ AM RADIO
- ☐ SATELLITE DBS
- ☐ ISDN DIGITAL

FIG. 5C

PROGRAM NAME

503

FIG. 5D

RECORDING FREQUENCY 504

- ☐ ONCE
- ☒ DAILY
- ☐ BI-WEEKLY
- ☐ WEEKLY
- ☐ MONTHLY
- ☐ OTHER

FIG. 5E

505

OK 507

506

CANCEL

SUBSTITUTE SHEET

FIG. 6

600

FREE PROGRAM MEMORY									4.75 HRS
#	LOCKED	TITLE	SOURCE	CHANNEL	TIME	DATE	LENGTH	NOTES	VIEWED
1	☐	-- NOT YET --	VHF	4	4:00 - 4:30	MAY 17, 1991	0.5	NOT YET RECORDED	☐
2	☐	--	FM	99.5	1:12 - 1:20	MAY 15, 1991	0.12		☒
3	☐	NIGHTLY NEWS	VHF #	4	6:00 - 8:00	MAY 13, 1991	2.0		☐
4	☒	BATMAN	CABLE	29	8:00 - 10:00	DEC 28, 1990	2.0	KEEP FOR WENDY	☐
5	☐	THE ASTRONOMERS	VHF	13	6:30 - 7:30	MAY 13, 1991	1.0		☐

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711a

FIG. 7

112a ☒ OUTPUT 1

112b ☐ OUTPUT 2

112c ☐ OUTPUT 3

☐ CONNECT

701

INPUT SELECTION	
CABLE TV	702
VHF TV	
DBS TV	
VHF TV	
FM RADIO	
AM RADIO	
VCR INPUT	
CASSETTE INPUT	
STORED PROGRAMMING	700

☐ ADD TO EXISTING OUTPUT

☐ REMOVE FROM OUTPUT

SELECTED OUTPUT STATUS 112a 703

SOURCES

VHF CHANNEL 2	703
VHF CHANNEL 4	
CABLE CHANNEL 21	
STORED PROGRAM 12	

MODE

TILED WINDOW	
--------------	--

SUBSTITUTE SHEET

FIG. 9

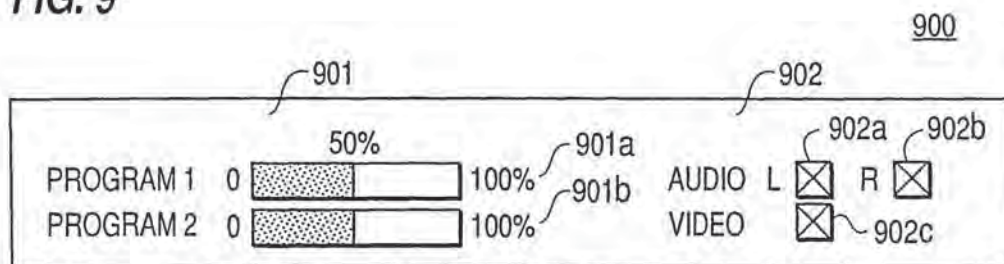


FIG. 12



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FIG. 10A

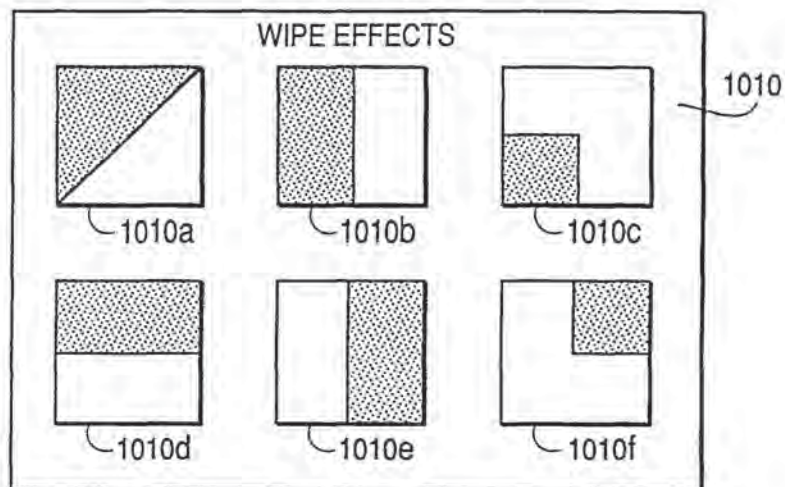


FIG. 10B

1000

1013		1011	1014	
1013a	WIPE TO COLOR	☐	WIPE PROGRAM SELECTION	
1013b	WIPE BETWEEN PROGRAMS	☒	1014a	1014b
FRAME NUMBERS				
1012	WIPE START	1012a	1015a	
	WIPE END	00100	1015b	
	TOTAL	99		
		1015		

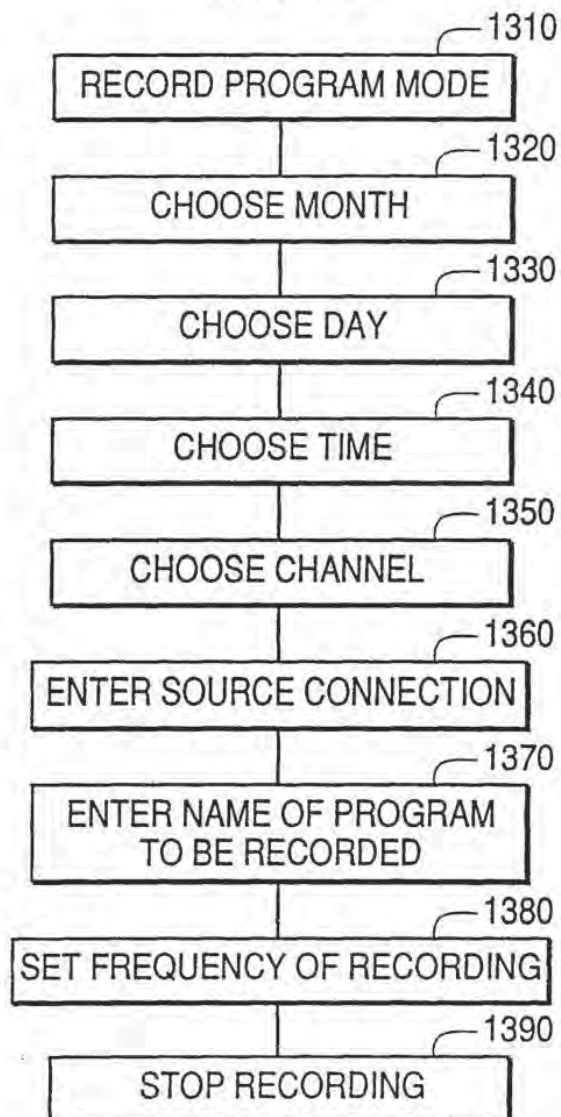
10/12

FIG. 11

WORD SEARCH	
SEARCH FOR	TIBET DOCUMENTARY
EXCLUDE	NEWSCASTS, MONGOLIA

SEARCH RESULTS		3 OF 13
	A 1 HOUR DOCUMENTARY ON LASHA THE CAPITAL OF TIBET PRIOR TO ITS OCCUPATION	▲
THE LANGUAGE OF TIBET	AN INTERACTIVE TIBETIAN LANGUAGE COURSE LESSON 1 OF 5	▼
THE LANGUAGE OF TIBET	AN INTERACTIVE TIBETIAN LANGUAGE COURSE LESSON 2 OF 5	

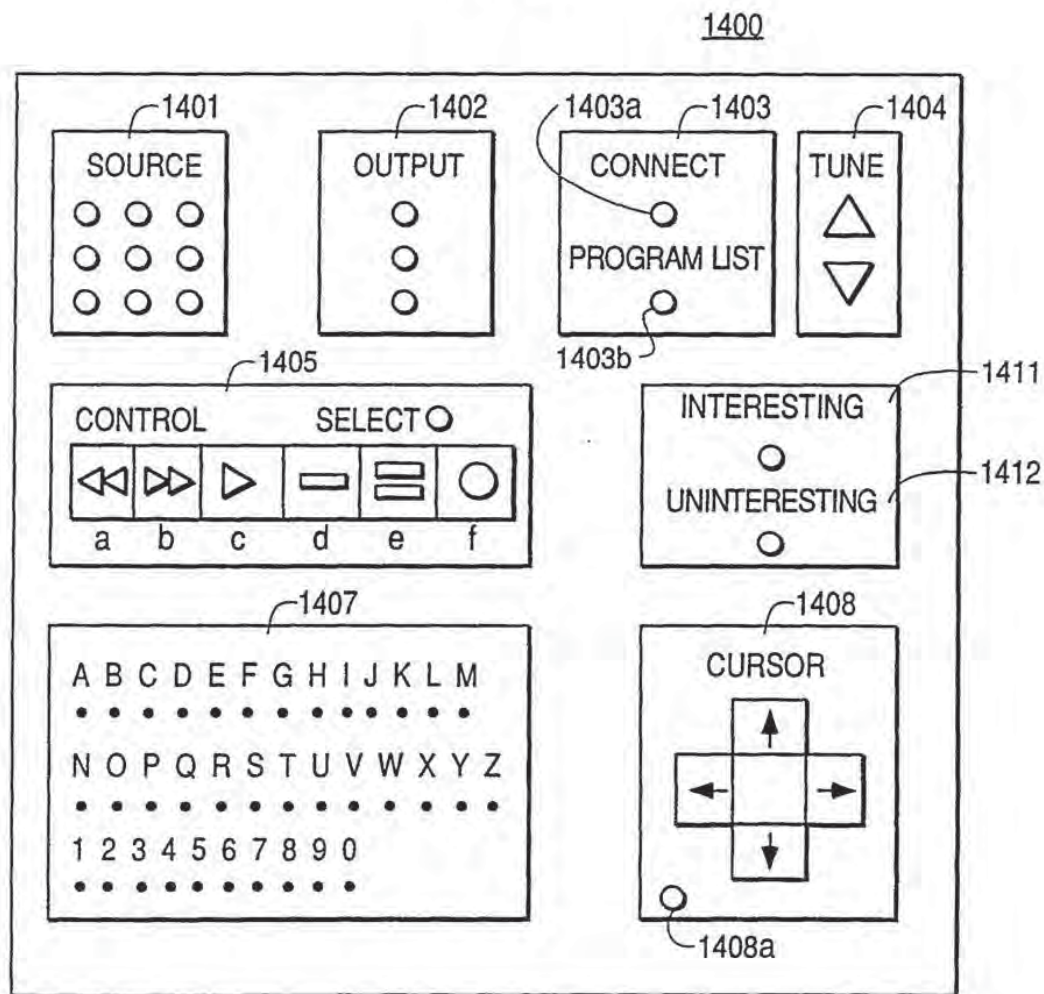
11/12

FIG. 13

SUBSTITUTE SHEET

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FIG. 14



Electronic Patent Application Fee Transmittal				
Application Number:		90009329		
Filing Date:		10-Nov-2008		
Title of Invention:		MULTIMEDIA TIME WARPING SYSTEM		
First Named Inventor/Applicant Name:		6233389		
Filer:		Greg H. Gardella/Lauren Barberena		
Attorney Docket Number:		2513.002REX0		
Filed as Large Entity				
ex parte reexam Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Petition fee- 37 CFR 1.17(f) (Group I)	1462	1	400	400
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				400

Electronic Acknowledgement Receipt	
EFS ID:	8698861
Application Number:	90009329
International Application Number:	
Confirmation Number:	2859
Title of Invention:	MULTIMEDIA TIME WARPING SYSTEM
First Named Inventor/Applicant Name:	6233389
Customer Number:	29000
Filer:	Greg H. Gardella/Lauren Barberena
Filer Authorized By:	Greg H. Gardella
Attorney Docket Number:	2513.002REX0
Receipt Date:	25-OCT-2010
Filing Date:	10-NOV-2008
Time Stamp:	20:04:38
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$400
RAM confirmation Number	9484
Deposit Account	090946
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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Information:					
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Warnings:					
Information:					
Total Files Size (in bytes):			88712052		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Barton et al.
U.S. Patent No.: 6,233,389
Issue Date: May 15, 2001
Serial No.: 09/126,071
Filing Date: July 30, 1998
Reexam Control No.: 90/009,329
Title: MULTIMEDIA TIME WARPING SYSTEM

Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION UNDER 37 C.F.R. §1.182

On October 15, 2010, the Office issued a *sua sponte* decision rejecting the Patent Owner's October 8, 2010 Information Disclosure Statement (IDS) on the basis that it was filed after the October 6, 2010 Notice of Intent to Issue *Ex Parte* Reexamination Certificate "and was not accompanied by a petition under 37 CFR 1.182." (*Decision at 2*) The instant petition under 37 C.F.R. §1.182 sets forth the reasons why the IDS was not filed until October 8th and requests leave to submit the references for the Office's consideration via the attached IDS.

The IDS statement was prepared and submitted in order to apprise the Office of potentially material information submitted in connection with Verizon's July 30, 2010 invalidity contentions in the case captioned *TiVo, Inc. v. Verizon Communications, Inc.*, Case No. 2:09-cv-257-DF in the United States District Court, Eastern District of Texas, Marshall Division. Because the undersigned's firm is not representing TiVo in connection with this particular litigation both the contentions and the materials cited therein had to be collected from the Robins, Kaplan firm.

The undersigned's team worked diligently to collect the materials and prepare the IDS. After receiving a copy of the July 30, 2010 invalidity contentions the undersigned's team began collecting the approximately 100 patent references and NPLs cited in the invalidity contentions. The team was able to collect many of the NPL documents independently and it promptly began doing so. On or about September 30, 2010 the undersigned's team concluded that certain of the NPL documents could not be independently retrieved within a reasonable period of time. The undersigned's team contacted the Robins, Kaplan firm to request that the remaining NPL documents be retrieved from the set of documents produced by Verizon in connection with the litigation. About one week later, on October 6, 2010, the remaining documents were received from the Robins, Kaplan firm. The undersigned filed the IDS two days later, on October 8, 2010.

In light of the foregoing facts and circumstances there exists good case for the submission of a belated IDS. The undersigned accordingly requests under §1.182 leave to submit the attached IDS, which resubmits the references for the Office's consideration.

Patentee: Barton et al.
Control No. : 90/009,329
Page: 3 of 4

The Office is authorized to charge deposit account 09-0946 for the fee set forth in 37 CFR §1.17(f) and to apply any additional charges or credits to that account.

Respectfully submitted,

Dated: October 25, 2010

/Greg H. Gardella/
Greg H. Gardella
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Patentee: Barton et al.
Control No. : 90/009,329
Page: 4 of 4

CERTIFICATE OF SERVICE

I hereby certify that on October 25, 2010, I caused a true and correct copy of the foregoing PETITION UNDER 37 C.F.R. §1.182 to be served via First Class U.S. Mail on the following:

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

Date: October 25, 2010

/Greg H. Gardella/
Greg H. Gardella
Reg. No. 46,045

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Barton et al.
U.S. Patent No.: 6,233,389
Issue Date: May 15, 2001
Serial No.: 09/126,071
Filing Date: July 30, 1998
Reexam Control No.: 90/009,329
Title: MULTIMEDIA TIME WARPING SYSTEM

Mail Stop Ex Parte Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

The attached PTO/SB/08a form list references produced in connection with co-pending litigation. Copies of the foreign patents and non-patent literature are attached. Copies of U.S. Patents will be furnished upon request.

No fee is believed due at this time. The Director is authorized to charge any fees or credit any overpayments to Deposit Account No. 09-0946.

Respectfully submitted,

Date: October 25, 2010

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CERTIFICATE OF SERVICE

I hereby certify that on October 25, 2010, I caused a true and correct copy of the foregoing INFORMATION DISCLOSURE STATEMENT to be served via First Class U.S. Mail on the following:

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Date: October 25, 2010

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UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/009,329	11/10/2008	6233389	2513.002REX0	2859

29000 7590 12/01/2010

IRELL & MANELLA LLP
1800 AVENUE OF THE STARS
SUITE 900
LOS ANGELES, CA 90067

EXAMINER

ART UNIT PAPER NUMBER

DATE MAILED: 12/01/2010

Please find below and/or attached an Office communication concerning this application or proceeding.



UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patents and Trademark Office
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THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS
MORRISON & FOERSTER LLP
DAVID L. FEHRMAN
555 WEST FIFTH STREET
LOS ANGELES, CA 90013

Date: **MAILED**

DEC 01 2010

CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90009329
PATENT NO. : 6233389
ART UNIT : 3992

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)).



UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450
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IRELL & MANELLA LLP
1800 AVENUE OF THE STARS
SUITE 900
LOS ANGELES CA 90067

(Patent Owner)

MAILED

DEC 01 2010

Morrison & Foerster LLP
555 West Fifth Street
Suite 3500
Los Angeles, CA 90013-1024

(Third Party Requester) **CENTRAL REEXAMINATION UNIT**

In re Barton et al.
Reexamination Proceeding
Control No.: 90/009,329
Filed: November 10, 2008
For: U.S. Patent No.: 6,233,389

:
: **DECISION**
: **ON PETITION**
: **UNDER 37 CFR 1.182**
:
:

This is a decision on the October 25, 2010 patent owner petition under 37 CFR 1.182 to enter, and to have the examiner consider, patent owner's third information disclosure statement (IDS) filed after the termination of the prosecution in this reexamination proceeding.

The petition is before the Office of Patent Legal Administration for decision.

The petition is dismissed for the reasons set forth below.

Thus, the IDS filed October 25, 2010, has not been entered for consideration by the examiner.

FEE

The petition fee of \$400 set forth in 37 CFR 1.17(f) for the present petition under 37 CFR 1.182 has been charged to Deposit Account No. 09-0946 in accordance with petitioner's authorization in the October 25, 2010 EFS-web fee transmittal.

BACKGROUND

1. On May 15, 2001, the Office issued U.S. Patent No. 6,233,389 to Barton *et al.* (the '389 patent).
2. On November 10, 2008, a third party requester filed a request for *ex parte* reexamination of the '389 patent. The request was assigned reexamination proceeding control number 90/009,329 (the '9329 proceeding).

3. On January 7, 2009, the Office issued an order granting reexamination for the '9329 reexamination proceeding.
4. Prosecution progressed to the point where, on October 6, 2010, the Office issued a Notice of Intent to Issue a Reexamination Certificate (NIRC) for the '9329 proceeding.
5. On October 8, 2010, patent owner filed an IDS in the '9329 proceeding, unaccompanied by a petition under 37 CFR 1.182, requesting consideration of an IDS submission after issuance of a NIRC.
6. On October 15, 2010, the '9329 proceeding entered the publication cycle and was accordingly assigned a 452 status.
7. Also on October 15, 2010, the Office issued a communication informing patent owner that the October 8, 2010 IDS submission was an untimely, improper post-NIRC submission which was being marked "closed" and "non-public" in the '9329 proceeding's IFW, because the submission was not accompanied by a petition under 37 CFR 1.182.
8. On October 25, 2010, patent owner filed the instant petition, accompanied by a second filing of the IDS, which patent owner requests the Office to consider.
9. The '9329 reexamination proceeding is in the final phase of the publication process for printing the reexamination certificate (*i.e.* it is in the publication cycle).

RELEVANT LAW AND PROCEDURE

35 U.S.C. 305 provides (in part):

... All reexamination proceedings under this section, including any appeal to the Board of Patent Appeals and Interferences, will be conducted with **special dispatch** within the Office. (Emphasis added.)

MPEP 2256 provides (in part):

.....Once the NIRC has been mailed, the reexamination proceeding must proceed to publication of the Reexamination Certificate as soon as possible. **Thus, when the patent owner provides a submission of patents and printed publications, or other information described in 37 CFR 1.98(a), after the NIRC has been mailed, the submission must be accompanied by (A) a factual accounting providing a sufficient explanation of why the information submitted could not have been submitted earlier, and (B) an explanation of the relevance of the information submitted with respect to the claimed invention in the reexamination proceeding.** This is provided via a petition under 37 CFR 1.182 (with petition fee) for entry and consideration of the information submitted after NIRC. The requirement in item (B) above is for the purpose of facilitating the Office's compliance with the statutory requirement for "special dispatch," when the requirement in item (A) above is satisfied to provide a basis for interrupting the proceeding after the NIRC. (Emphasis added)

Once the reexamination has entered the Reexamination Certificate publication process, pulling the proceeding from that process provides an even greater measure of delay. 37 CFR 1.313 states for an application (emphasis added):

"(c) Once the issue fee has been paid, the application will not be withdrawn from issue upon petition by the applicant for any reason except:

(I) Unpatentability of one or more claims, which petition must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;"

The publication process for an application occurs after the payment of the issue fee (there is no issue fee in reexamination), and thus 37 CFR 1.313(c) applies during the publication cycle for an application. Based on the statutory requirement for "special dispatch," the requirements for withdrawal of a reexamination proceeding from its publication cycle are at least as burdensome as those set forth in 37 CFR 1.313(b) and (c). **Accordingly, where a submission of patents and printed publications, or other information described in 37 CFR 1.98(a), is made while a proceeding is in its publication cycle, the patent owner must provide an unequivocal statement as to**

why the art submitted makes at least one claim unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable. This is in addition to the above-discussed (A) a factual accounting providing a sufficient explanation of why the information submitted could not have been submitted earlier. The submission of patents and printed publications must be accompanied by a petition under 37 CFR 1.182 (with petition fee) for withdrawal of the reexamination proceeding from the publication process for entry and consideration of the information submitted by patent owner. A grantable petition must provide the requisite showing discussed in this paragraph. (Emphasis added)

DECISION

There is no issue fee in reexamination, and the present reexamination proceeding has entered the final phase of the publication process (the "printing cycle"). In a reexamination proceeding, there is no withdrawal under 37 CFR 1.313 of the proceeding from the publication process for consideration of an Information Disclosure Statement (IDS), because 37 CFR 1.313(a) applies to applications, and not to reexamination proceedings. Accordingly, in this instance, the petition for withdrawal of the present proceeding from the publication process for consideration of the accompanying IDS papers has been filed under 37 CFR 1.182.

While there is no regulatory provision for withdrawal of a reexamination proceeding from the publication process for consideration of an IDS, the policy for withdrawal from the publication process is explicitly set forth in MPEP 2256 as follows:

...Once the NIRC has been mailed, the reexamination proceeding must proceed to publication of the Reexamination Certificate as soon as possible. Thus, when the patent owner provides a submission of patents and printed publications, or other information described in 37 CFR 1.98(a), after the NIRC has been mailed, the submission must be accompanied by (A) a **factual accounting providing a sufficient explanation of why the information submitted could not have been submitted earlier, and (B) an explanation of the relevance of the information submitted with respect to the claimed invention in the reexamination proceeding.** This is provided via a petition under 37 CFR 1.182 (with petition fee) for entry and consideration of the information submitted after NIRC. The requirement in item (B) above is for the purpose of facilitating the Office's compliance with the statutory requirement for "special dispatch," when the requirement in item (A) above is satisfied to provide a basis for interrupting the proceeding after the NIRC.

... The **publication process** for an application occurs after the payment of the issue fee (there is no issue fee in reexamination), and thus 37 CFR 1.313(c) applies during the publication cycle for an application. Based on the statutory requirement for "special dispatch," the requirements for withdrawal of a reexamination proceeding from its publication cycle are at least as burdensome as those set forth in 37 CFR 1.313(b) and (c). **Accordingly, where a submission of patents and printed publications, or other information described in 37 CFR 1.98(a), is made while a proceeding is in its publication cycle, the patent owner must provide an unequivocal statement as to why the art submitted makes at least one claim unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable.** This is in addition to the above-discussed (A) a factual accounting providing a sufficient explanation of why the information submitted could not have been submitted earlier. The submission of patents and printed publications must be accompanied by a petition under 37 CFR 1.182 (with petition fee) for withdrawal of the reexamination proceeding from the publication process for entry and consideration of the information submitted by patent owner. A grantable petition must provide the requisite showing discussed in this paragraph. (Emphasis added)

In the present instance, the fact situation fails to satisfy the grounds for the entry of information after issuance of a NIRC, either before or after the proceeding has entered the publication cycle. The instant petition was filed very late in the reexamination proceeding, and it fails to provide a statement explaining the relevance of the submitted IDS items of information (art citations), with respect to the claim limitations in the present reexamination proceeding. The petition merely states, "The IDS statement was prepared and submitted in order to apprise the Office of

potentially material information submitted . . .” Further, the petition does not explain how the submitted IDS items of information make at least one claim unpatentable, and the petition is not accompanied with an amendment to the claim or claims with an explanation as to how the amendment causes such claim or claims to be patentable.

For *ex parte* reexamination, 35 U.S.C. 305 provides that all *ex parte* reexamination proceedings “will be conducted with special dispatch within the Office.” Since it is required that the withdrawal criteria of 37 CFR 1.313(c) be complied with for an application, in which there is no statutory provision for special dispatch, such criteria must certainly be complied with for a reexamination proceeding *where there is a statutory mandate for special dispatch*. This is explicitly set forth in the MPEP, as set forth above.

A review of the record shows that the examiner terminated prosecution on the merits by issuing a NIRC on October 6, 2010, and the proceeding has now entered the final stages of the publication process, *i.e.* the publication cycle, as evidenced by the proceeding’s 452 status. The proceeding is clearly not scheduled to come up for further action on the merits. In order to provide the requested relief, the present proceeding would need to be withdrawn from the publication process, thus significantly regressing the processing of the proceeding. This would run contrary to the statutory requirement of 35 U.S.C. 305 that “[a]ll reexamination proceedings under this section...will be conducted with special dispatch within the Office.” The statutory mandate of special dispatch is based upon the public interest in providing certainty and finality as to the question of patentability raised by a request for reexamination. In view of the submission of the IDS information after termination of the prosecution in this reexamination proceeding, the failure explain why it could not have been submitted earlier, the failure to identify a question of patentability as to the claims, and the failure to provide the requisite discussion (explanation) of the submitted art citations, the present reexamination proceeding will not be reopened at this late date to consider the proffered IDS papers. Accordingly, the petition is dismissed as to the request for consideration of the IDS papers. The proceeding will not be withdrawn from the publication process.

If, however, the patent owner in fact believes that one or more references submitted raises a substantial question of patentability as to at least one claim of the patent *different* than raised in this proceeding, the patent owner can always file a new request for reexamination for consideration of such reference(s).

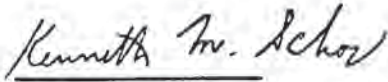
The IDS submitted by patent owner will be placed in the file, and will remain of record. However, since prosecution has been terminated for this reexamination proceeding, the IDS will not be considered by the examiner.

In view of the above, the petition is dismissed.

CONCLUSION

1. The petition is dismissed as to the request for consideration of the October 25, 2010 IDS.
2. The IDS papers have not been entered for consideration by the examiner. A copy of the October 25, 2010 IDS submission will, however, be placed in the electronic file of the proceeding.

3. The present proceeding will continue in the publication process, toward issuance of a reexamination certificate.
4. Telephone inquiries related to this decision should be directed to Joseph F. Weiss, Jr., Legal Advisor, at (571) 272-7759.



Kenneth M. Schor
Senior Legal Advisor
Office of Patent Legal Administration

11-30-10



US006233389C2

(12) **EX PARTE REEXAMINATION CERTIFICATE (8037th)**
United States Patent
Barton et al.

(10) **Number:** **US 6,233,389 C2**
 (45) **Certificate Issued:** **Feb. 15, 2011**

(54) **MULTIMEDIA TIME WARPING SYSTEM**

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

(73) Assignee: **Citigroup Global Markets Realty Corp.**, New York, NY (US)

Reexamination Request:
 No. 90/009,329, Nov. 10, 2008

Reexamination Certificate for:
 Patent No.: **6,233,389**
 Issued: **May 15, 2001**
 Appl. No.: **09/126,071**
 Filed: **Jul. 30, 1998**

Reexamination Certificate CI 6,233,389 issued Nov. 11, 2008

(51) **Int. Cl.**
G11B 27/10 (2006.01)
G11B 27/034 (2006.01)
G11B 27/031 (2006.01)
G11B 27/032 (2006.01)
H04N 5/775 (2006.01)
H04N 5/44 (2006.01)
H04N 5/00 (2006.01)

(52) **U.S. Cl.** **386/46; 348/E5.007; 348/E5.108; 386/68; 386/E5.043; 386/E5.07**

(58) **Field of Classification Search** **386/46**
 See application file for complete search history.

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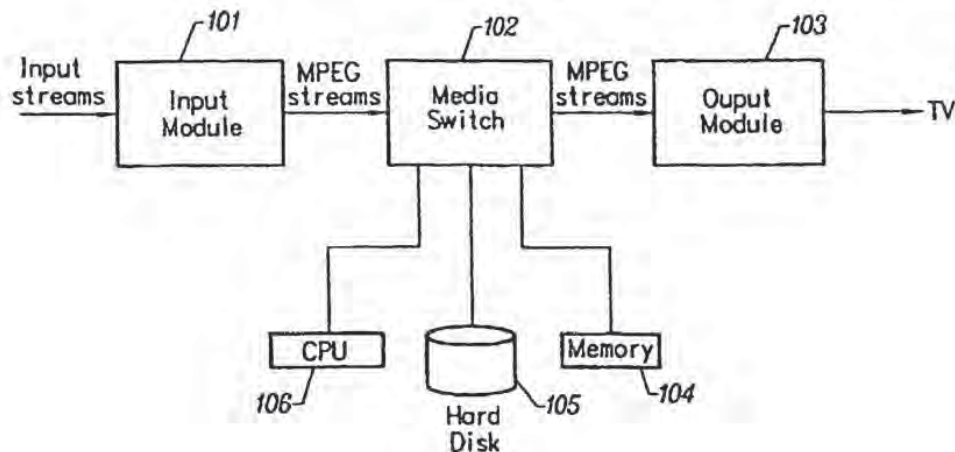
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(Continued)

Primary Examiner—Fred Ferris

(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.



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1
EX PARTE
REEXAMINATION CERTIFICATE
ISSUED UNDER 35 U.S.C. 307

NO AMENDMENTS HAVE BEEN MADE TO
THE PATENT

2
AS A RESULT OF REEXAMINATION, IT HAS BEEN
DETERMINED THAT:

5 The patentability of claims **31** and **61** is confirmed.
Claims **1-30** and **32-60** were not reexamined.

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