

る。

【図66】本実施の形態5のプレイバック機能付き記録再生装置の両面記録型磁気ディスクのトラック番号とリングバッファのリング状アドレスとの関係を示す図である。

【図67】本発明の実施の形態6としての、磁気ディスクを複数枚使用したプレイバック機能付き記録再生装置の構成図である。

【図68】本発明の実施の形態6としての、磁気ディスクを複数枚使用したプレイバック機能付き記録再生装置の構成図である。

【図69】本発明の実施の形態6としての、磁気ディスクを複数枚使用したプレイバック機能付き記録再生装置の構成図である。

【図70】本発明の実施の形態6としての、磁気ディスクを複数枚使用したプレイバック機能付き記録再生装置の構成図である。

【図71】本発明の実施の形態7としての、マルチウィンドウ表示が可能なプレイバック機能付き記録再生装置の構成図である。

【図72】本発明の実施の形態7としての、マルチウィンドウ表示が可能なプレイバック機能付き記録再生装置の構成図である。

【図73】本発明の実施の形態7としての、マルチウィンドウ表示が可能なプレイバック機能付き記録再生装置の構成図である。

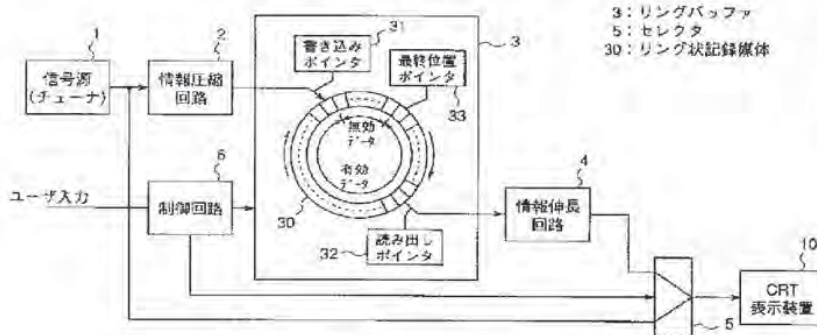
【図74】本発明の実施の形態7としての、マルチウィンドウ表示が可能なプレイバック機能付き記録再生装置の構成図である。

【符号の説明】

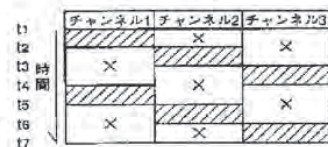
- 1、1 a、...、1 n チューナ
- 2、2 a、...、2 n 情報圧縮回路
- 3、3 a、...、3 n リングバッファ
- 4 情報伸長回路

- 5、7 セレクタ
- 6 制御回路
- 7 a 第1記録ヘッド
- 7 b 第2記録ヘッド
- 8 メインチューナ
- 9 信号処理回路
- 9 a 第1再生ヘッド
- 9 b 第2再生ヘッド
- 10 CRT表示装置
- 13 記録回路
- 14 磁気ディスク
- 15 スピンドルモータ
- 16 回転軸
- 17 a 第1記録ヘッド
- 17 b 第2記録ヘッド
- 19 a 第1再生ヘッド
- 19 b 第2再生ヘッド
- 20 ハードディスクドライブ装置
- 21 記録ヘッド駆動機構部
- 22 再生ヘッド駆動機構部
- 23 制御部
- 24 再生回路
- 30 リング状記録媒体
- 31 書き込みポインタ
- 32 読み出しポインタ
- 33 最終位置ポインタ
- 101、201、...、m01 チューナ
- 102、202、...、m02 情報圧縮回路
- 103、203、...、m03 リングバッファ
- 120 再生装置部
- 121 再生ヘッド選択部
- 122 再生回路
- 123 情報伸長部
- 124 マルチウィンドウ合成回路

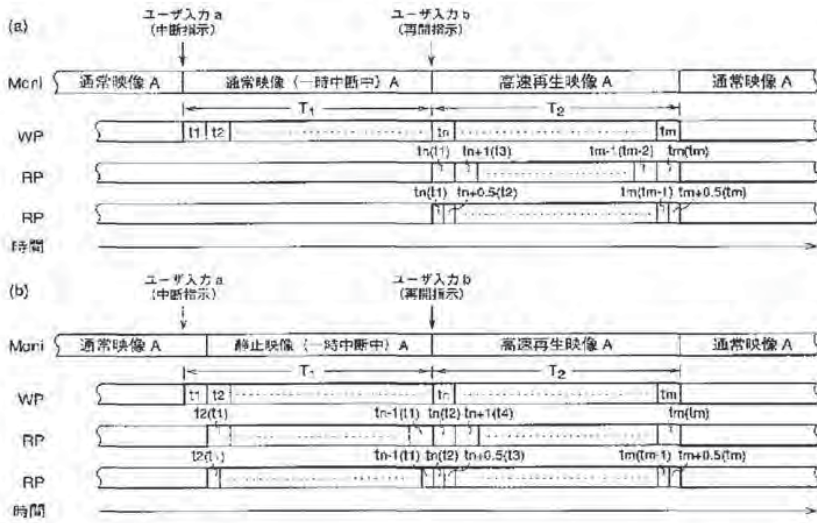
【図1】



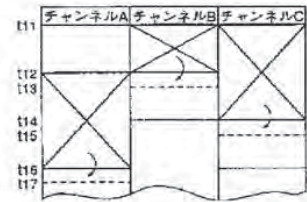
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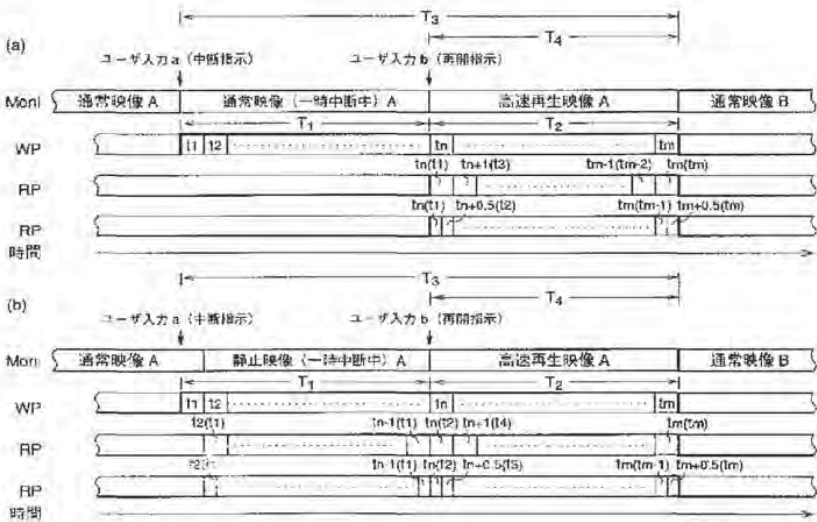
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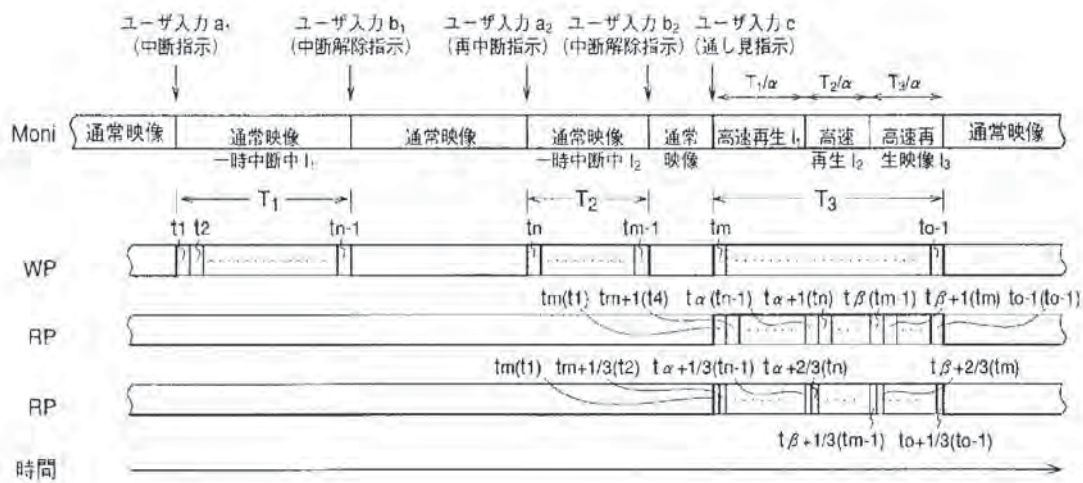


【図 11】



【図 3】

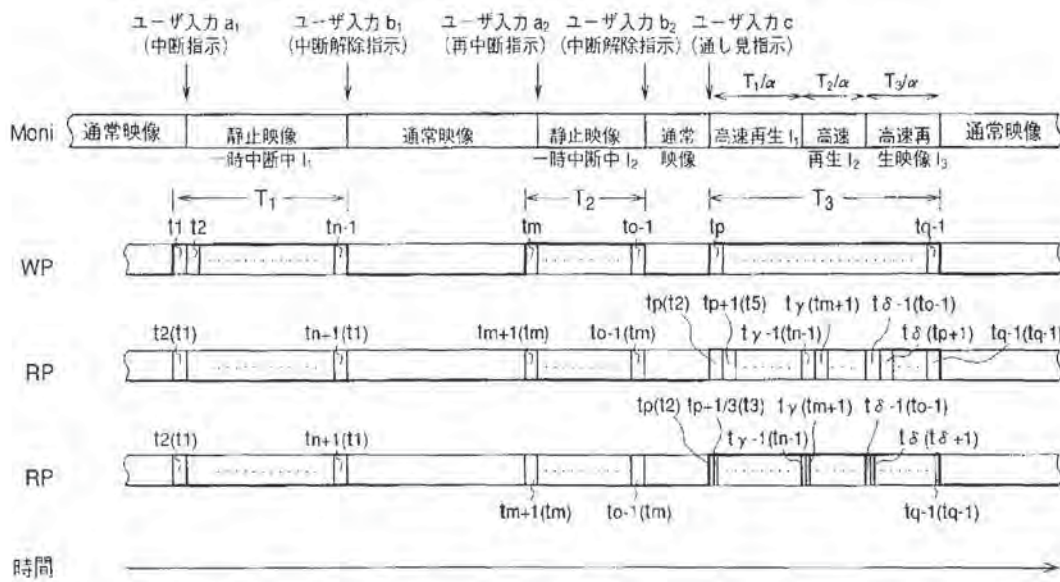




【図4】

(34)

特開平10-56620

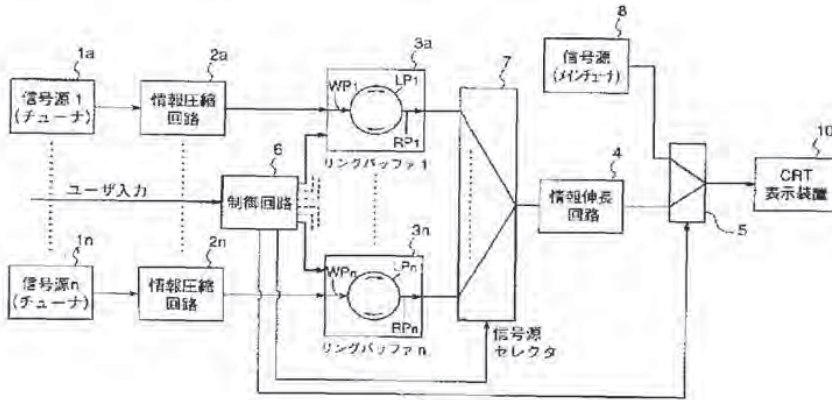


【図5】

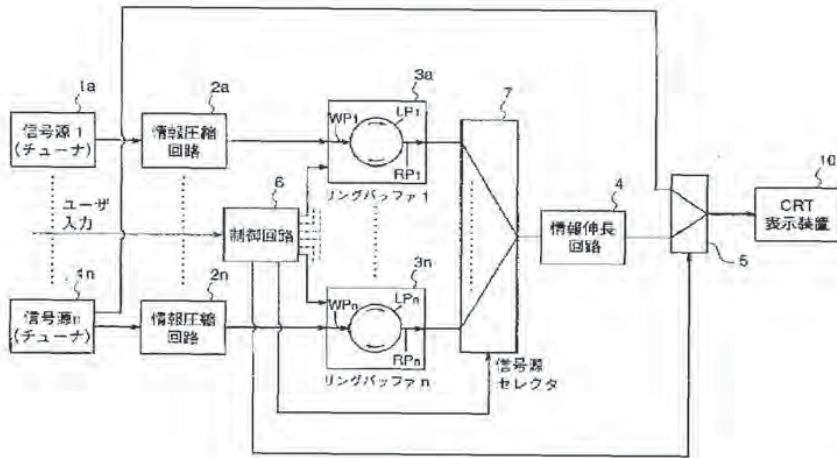
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特開平10-56620

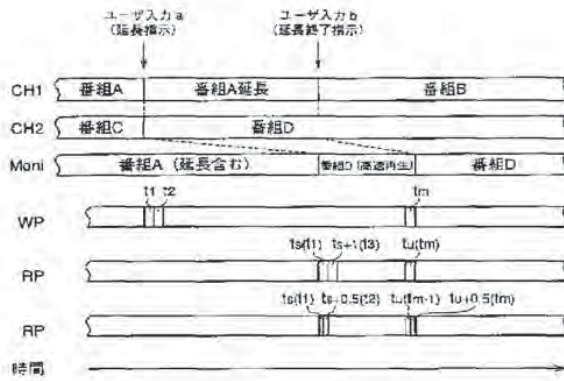
【図6】



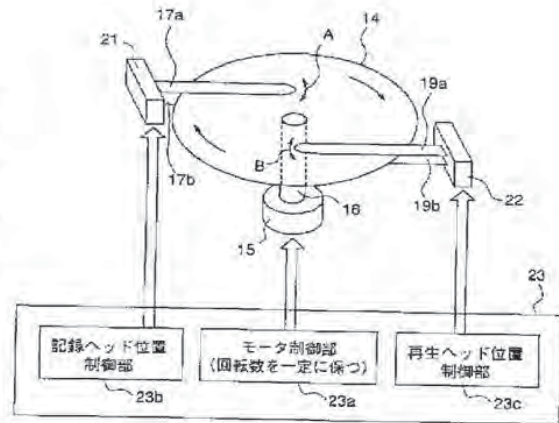
【図7】



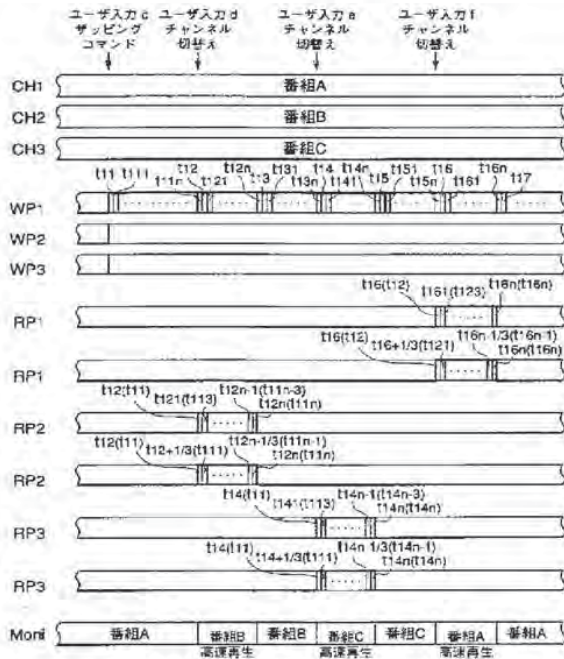
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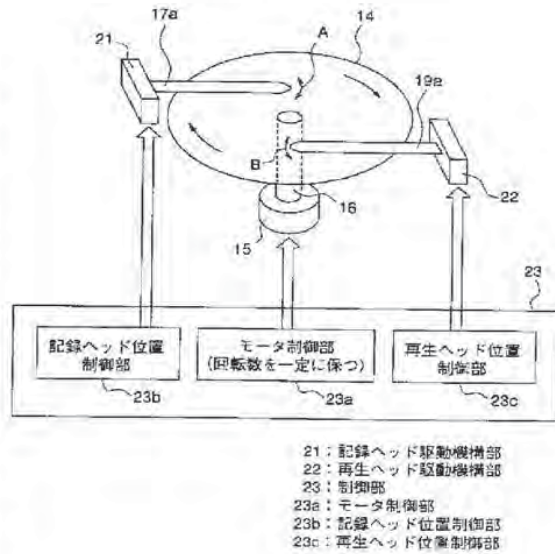
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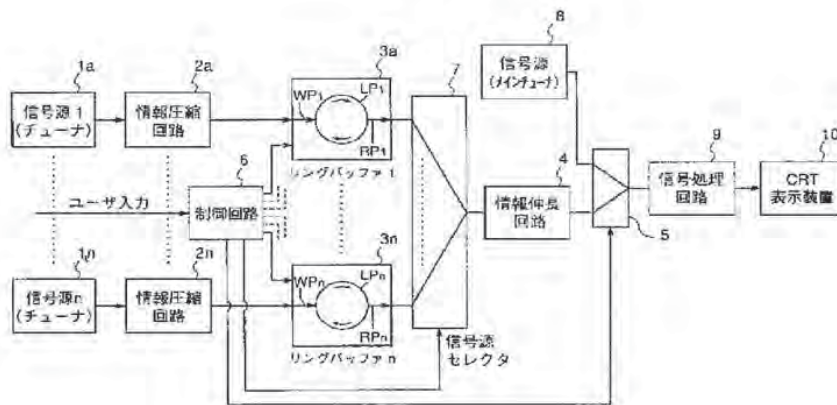
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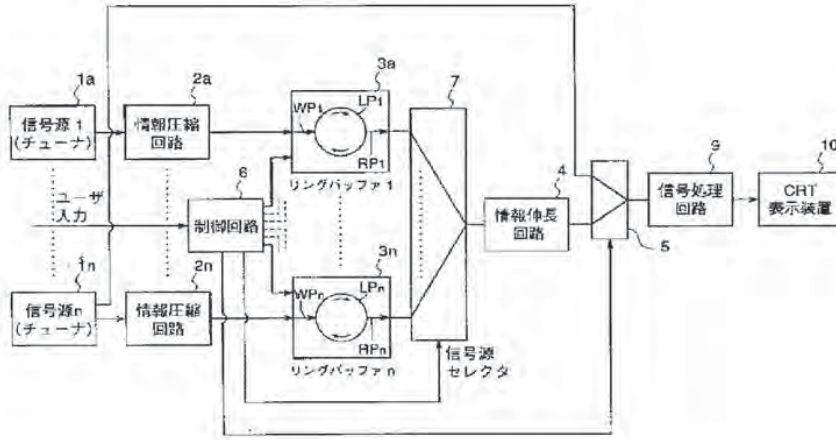
【図20】



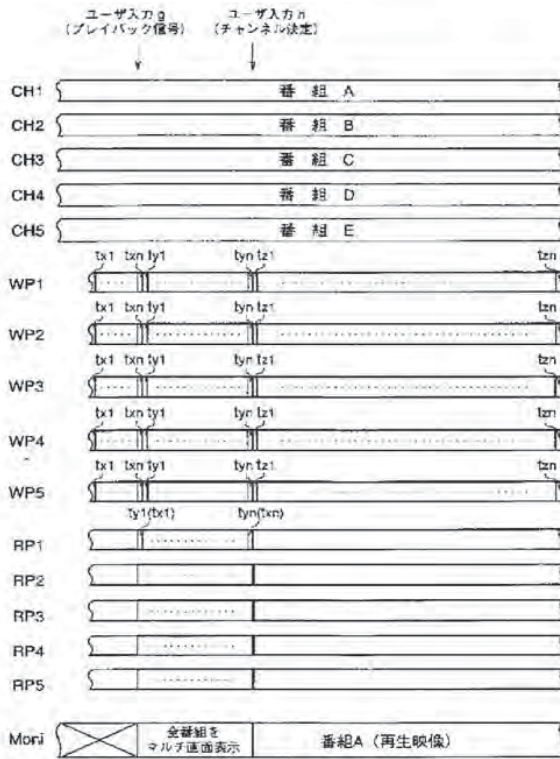
【図12】



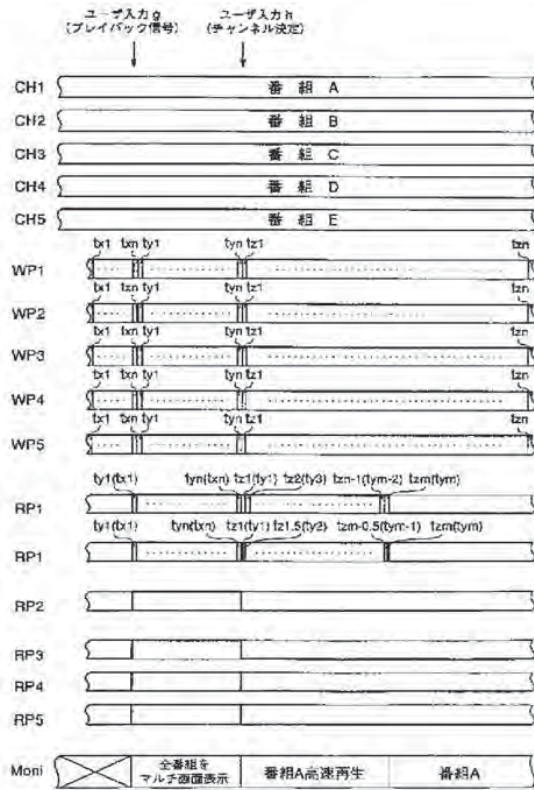
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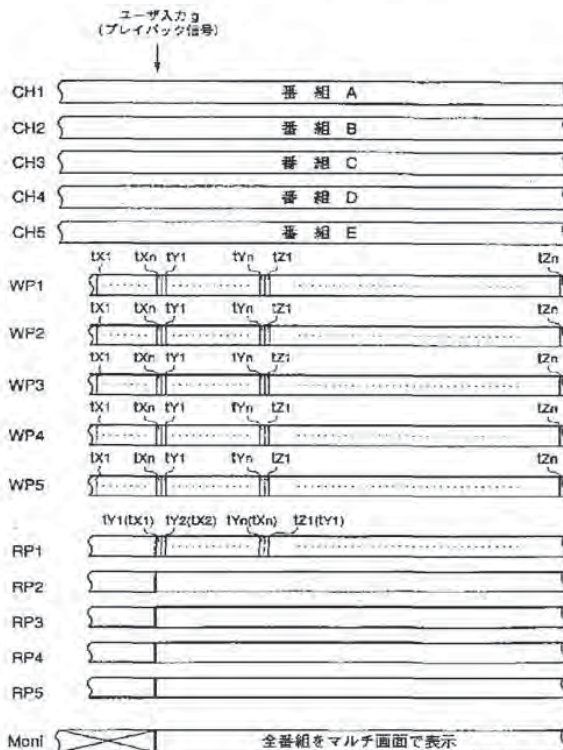
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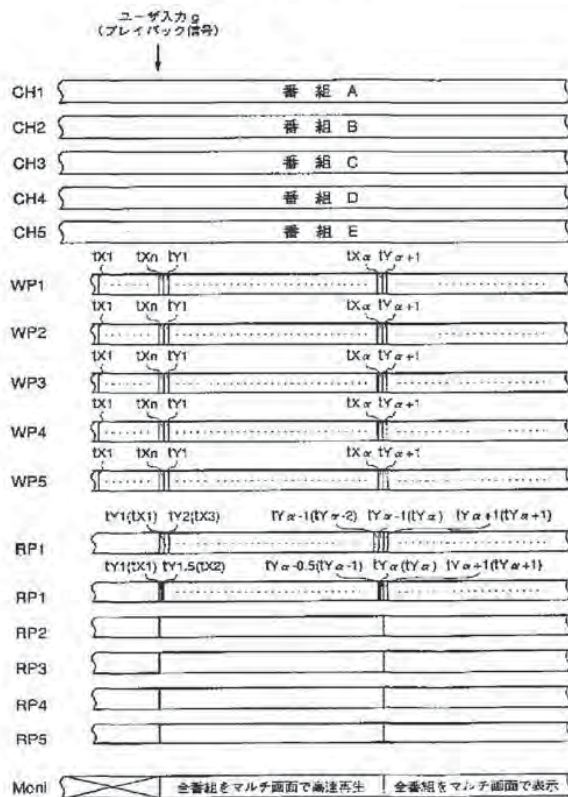
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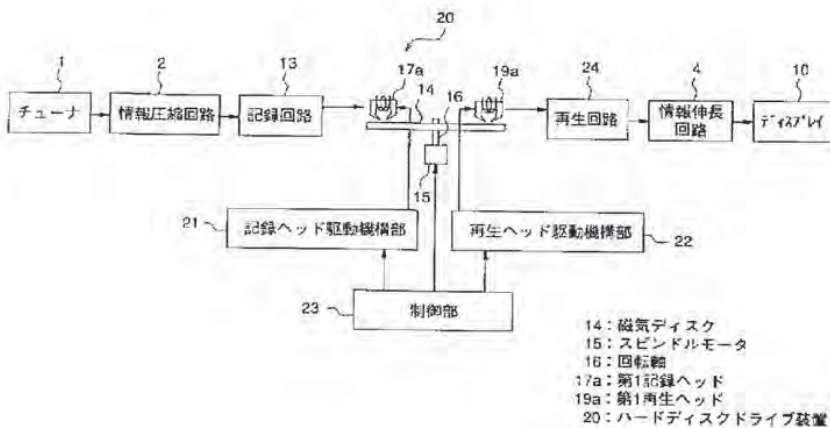
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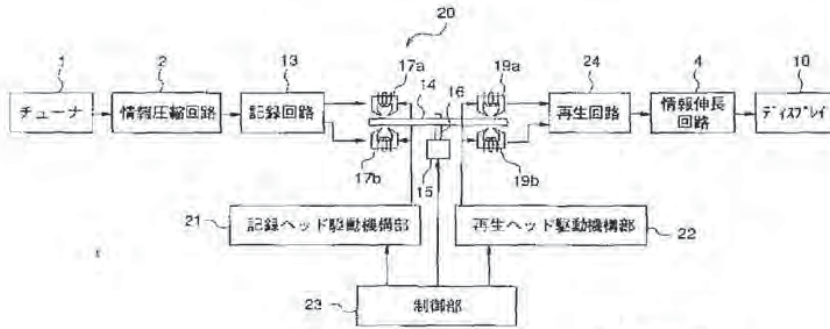
【図17】



【図18】

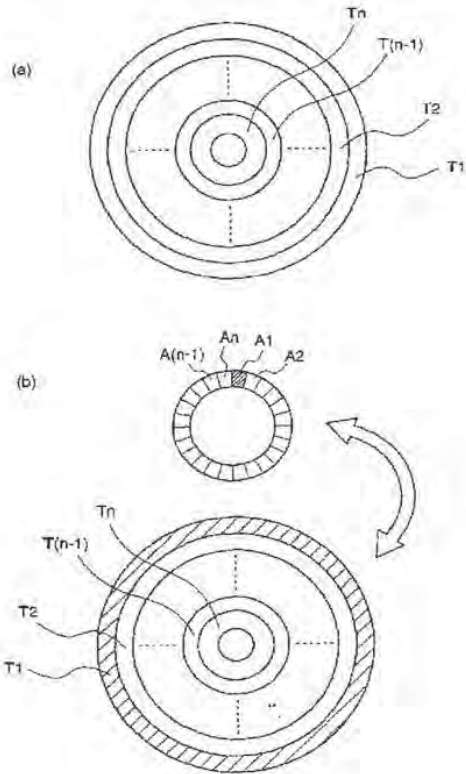


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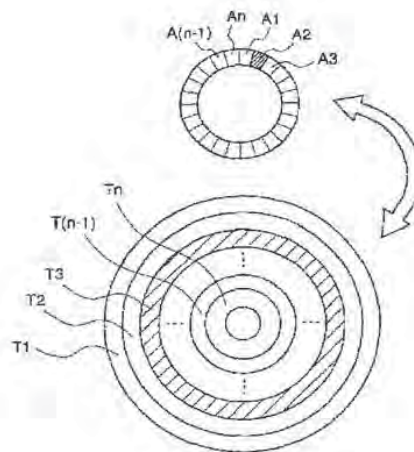


17b: 第2記録ヘッド
19b: 第2再生ヘッド

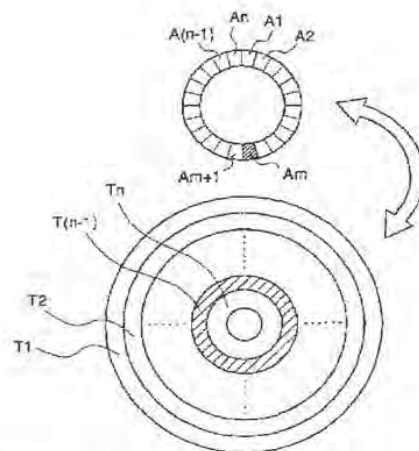
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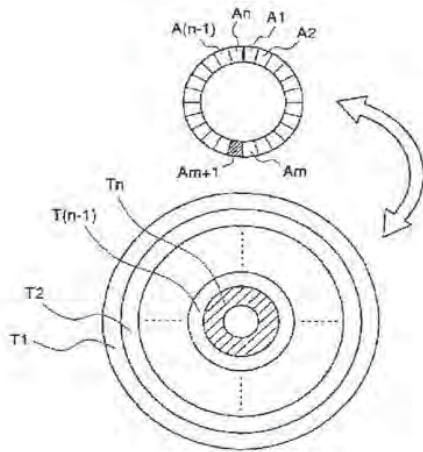
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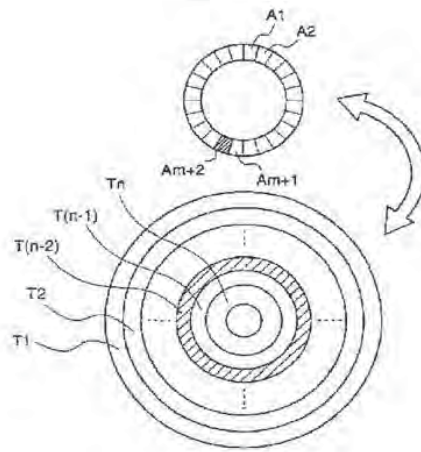
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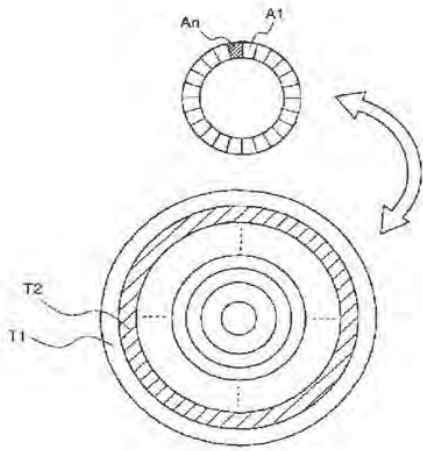
【図25】



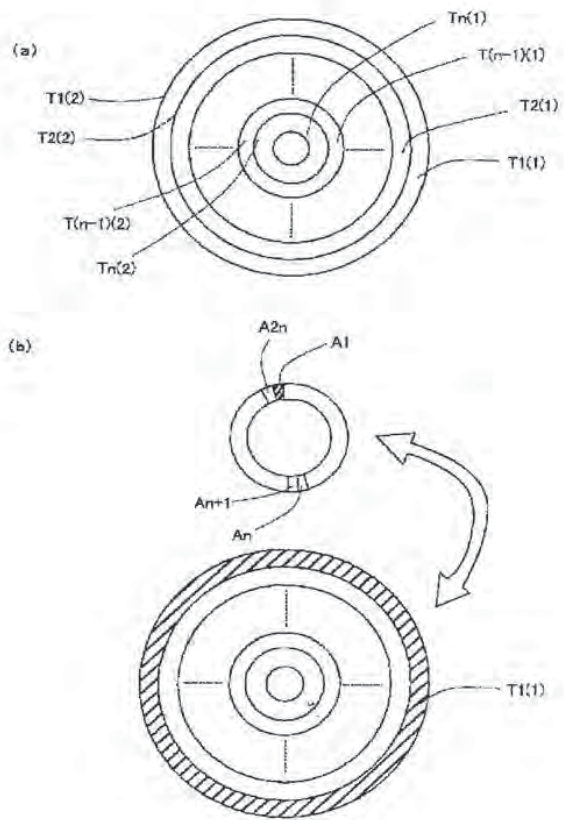
【図26】



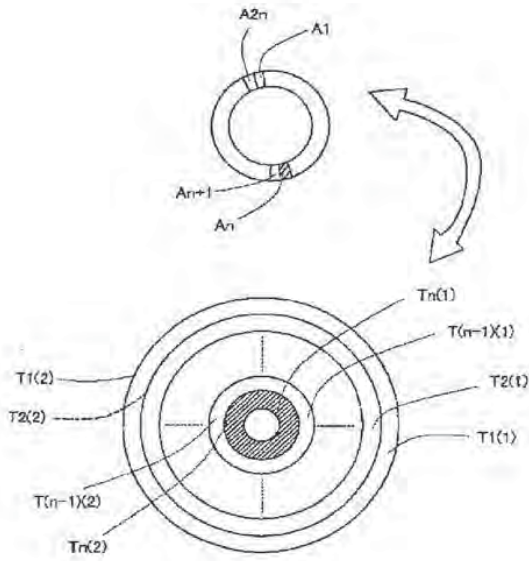
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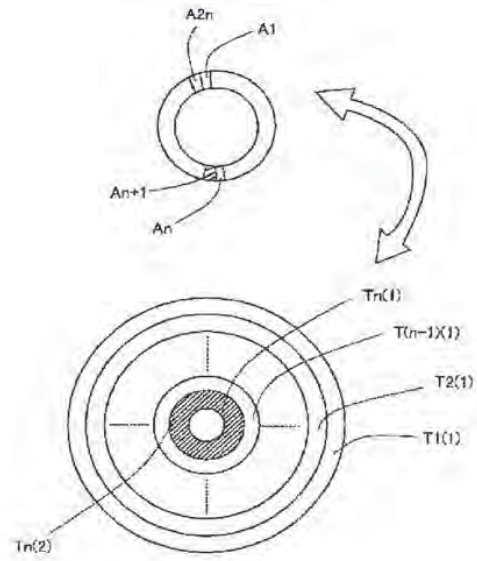
【図28】



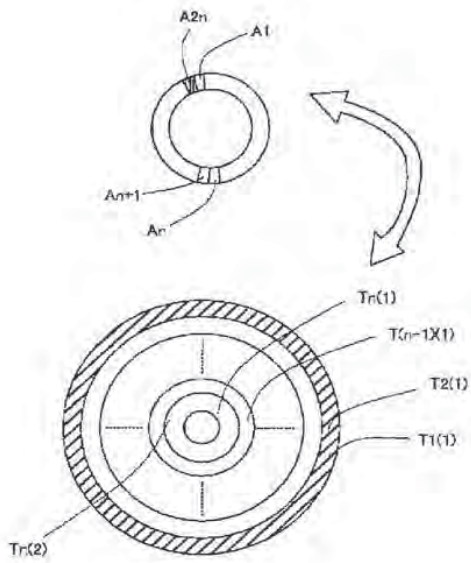
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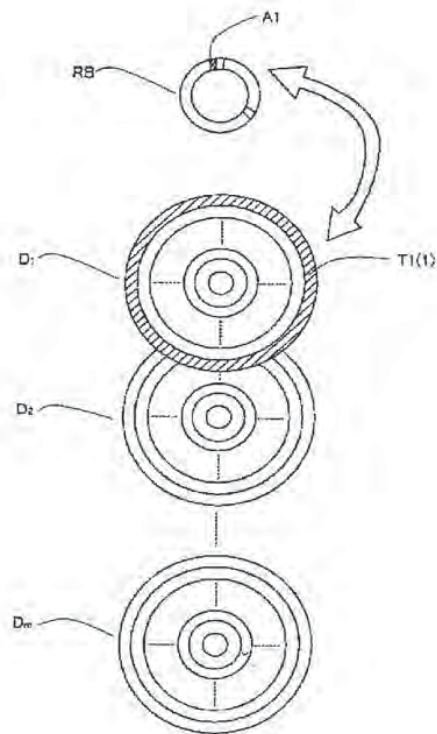
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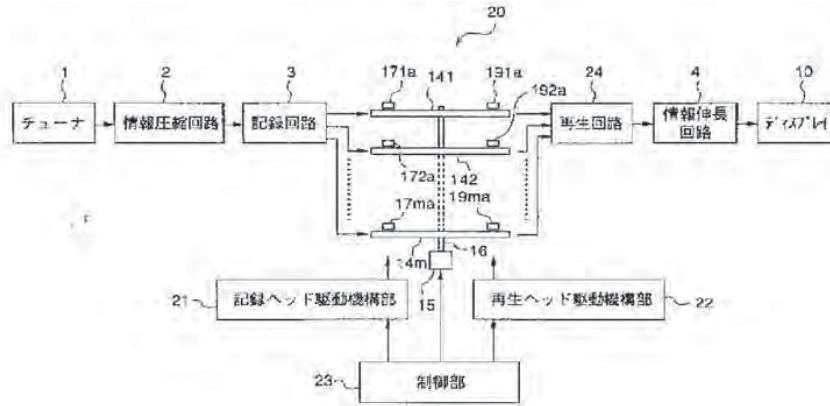
【図31】



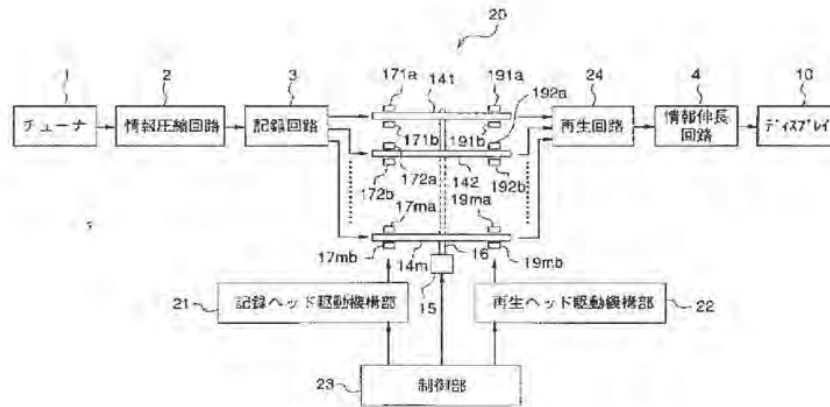
【図34】



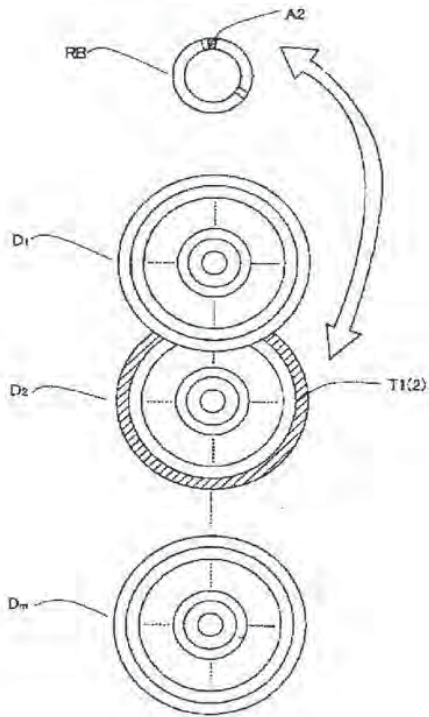
【図32】



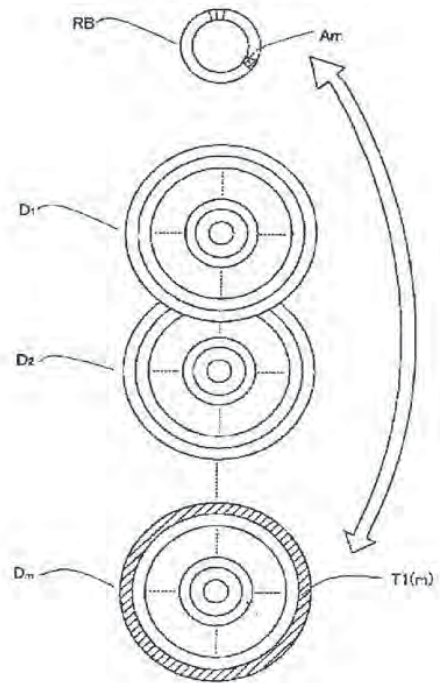
【図33】



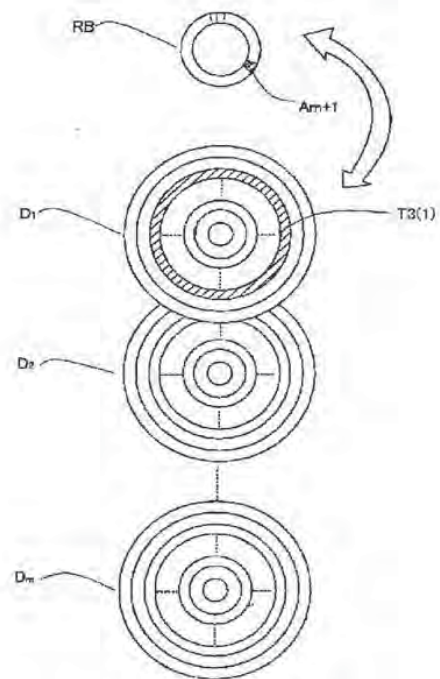
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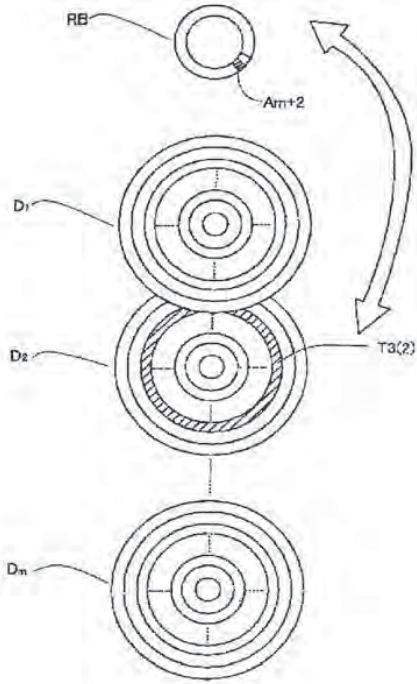
【図36】



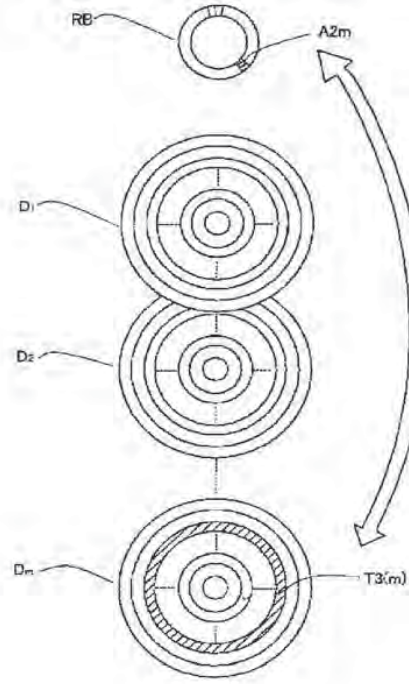
【図37】



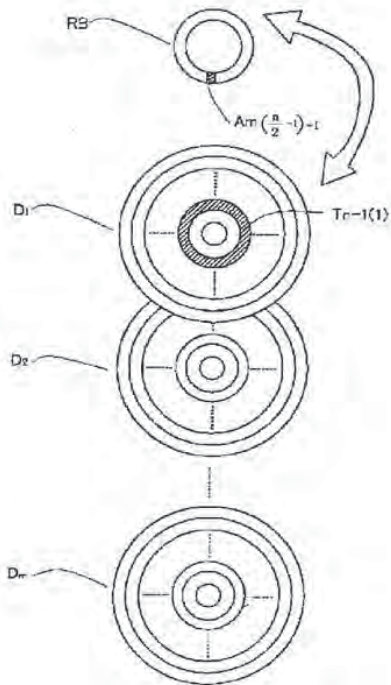
【図38】



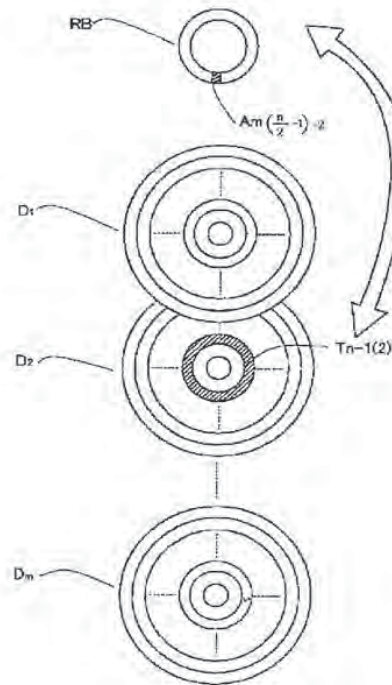
【図39】



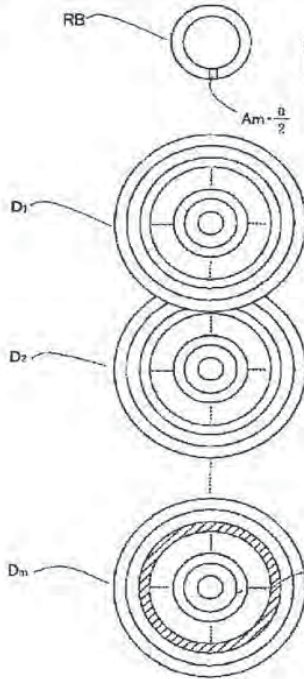
【図40】



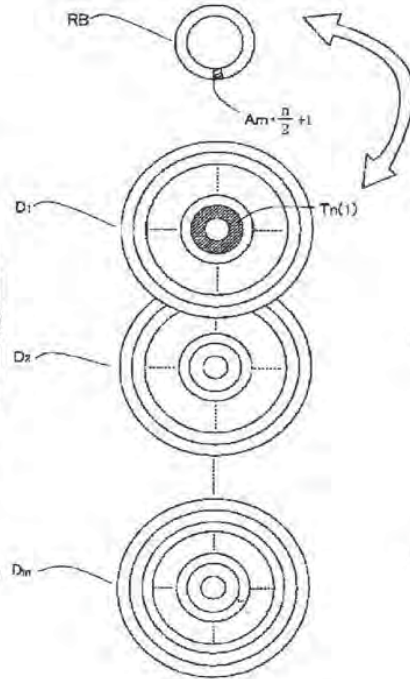
【図41】



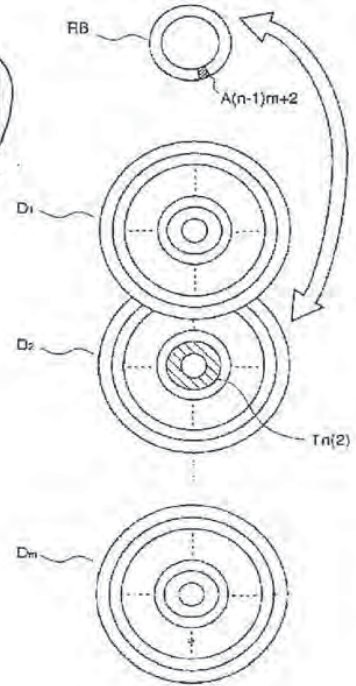
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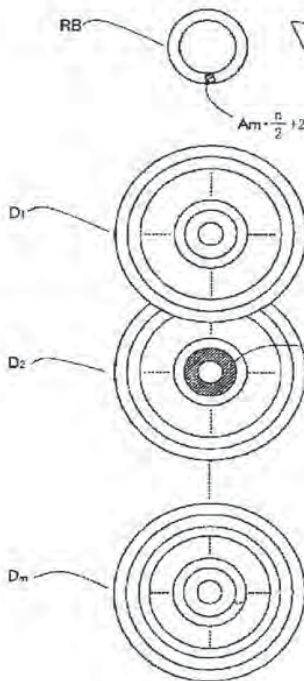
【図43】



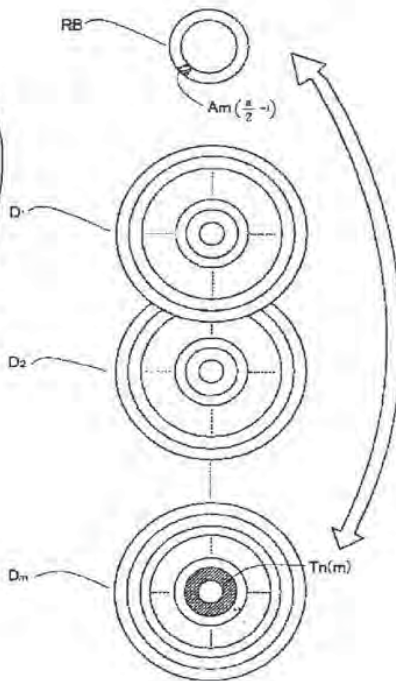
【図59】



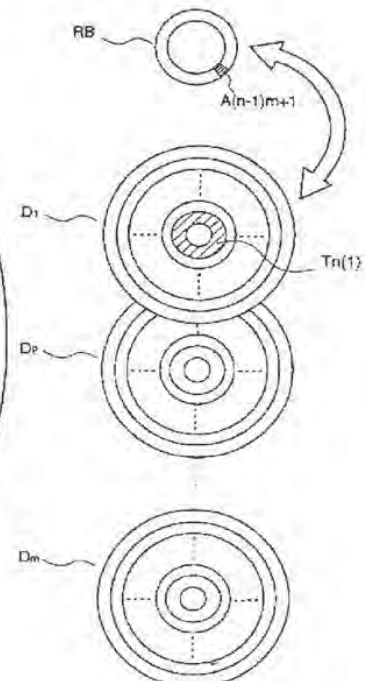
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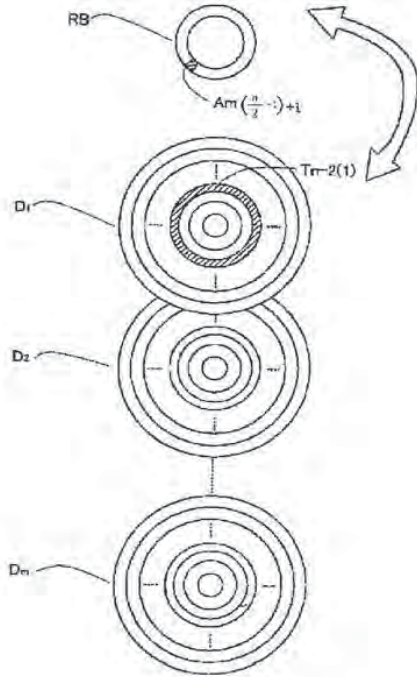
【図45】



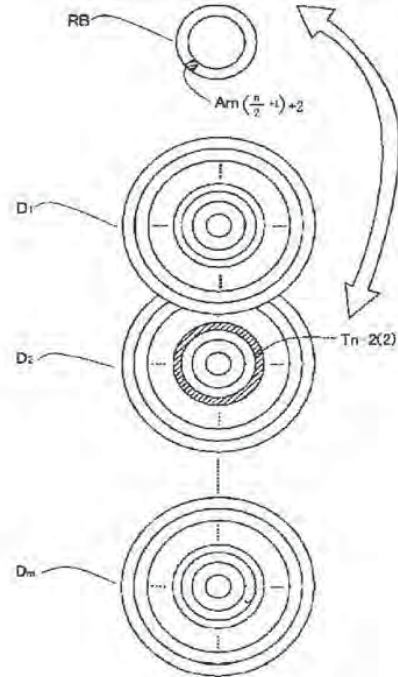
【図58】



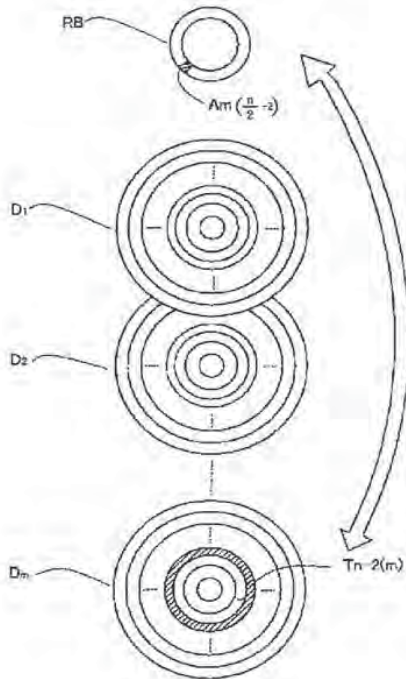
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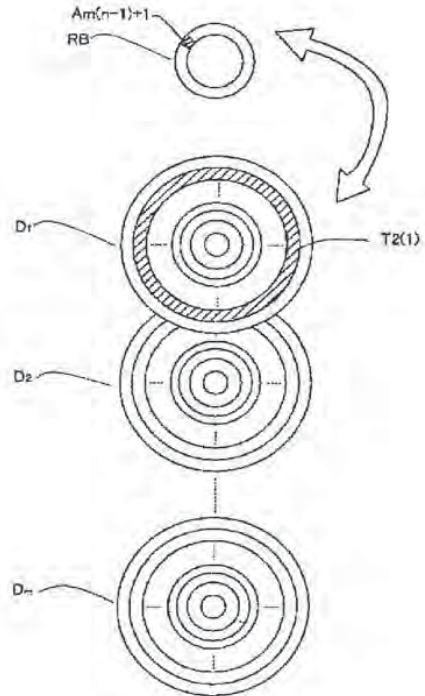
【図47】



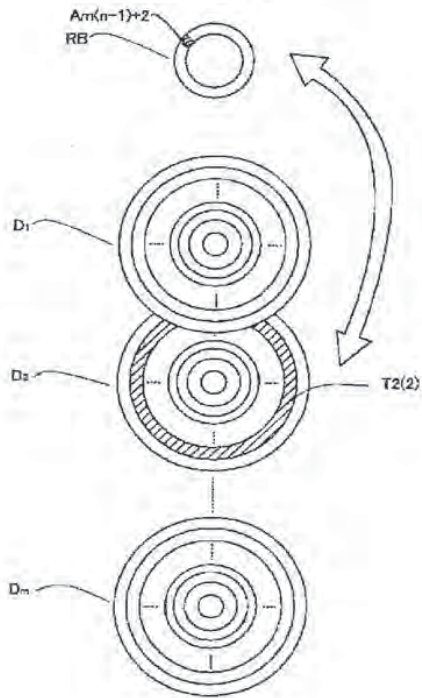
【図48】



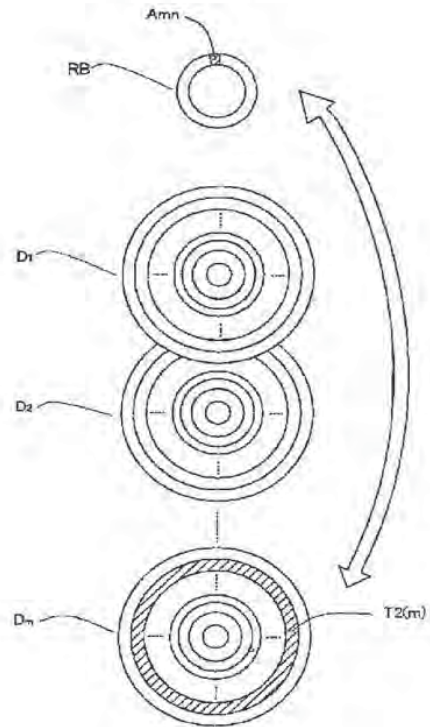
【図49】



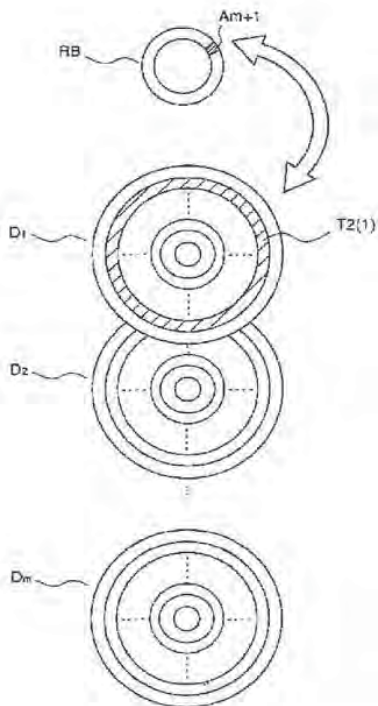
【図50】



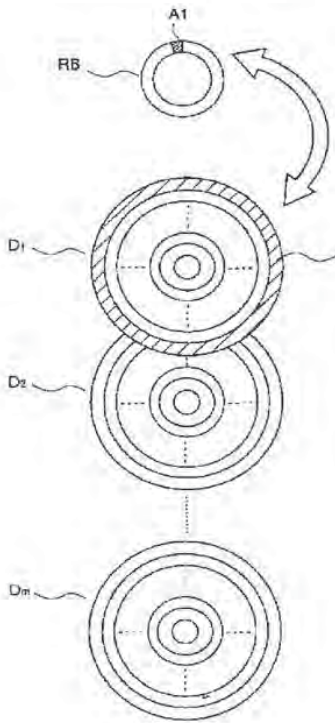
【図51】



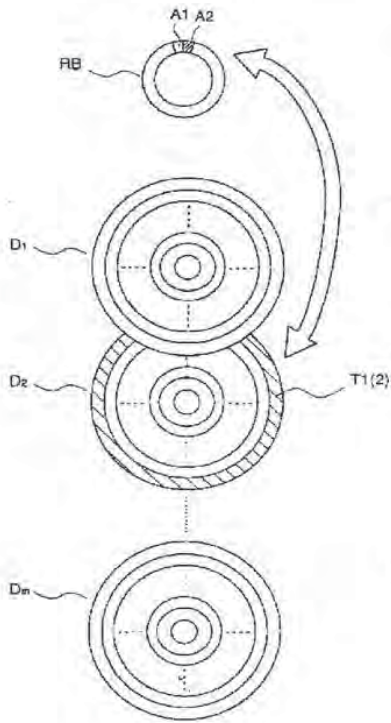
【図55】



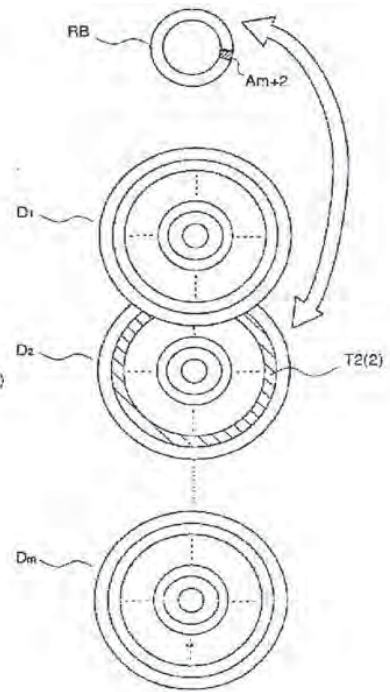
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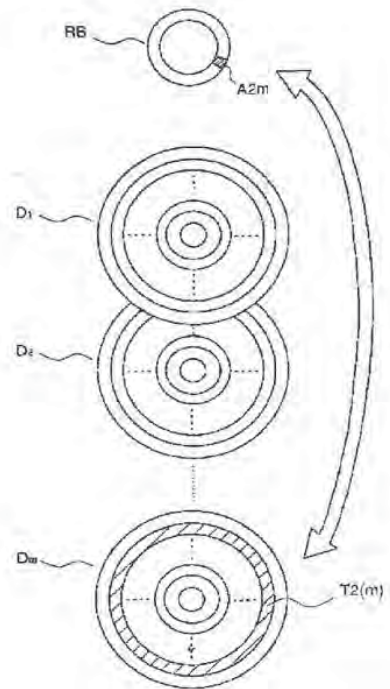
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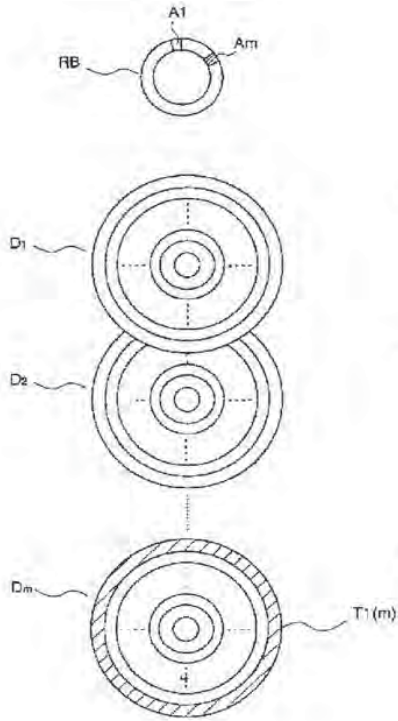
【図56】



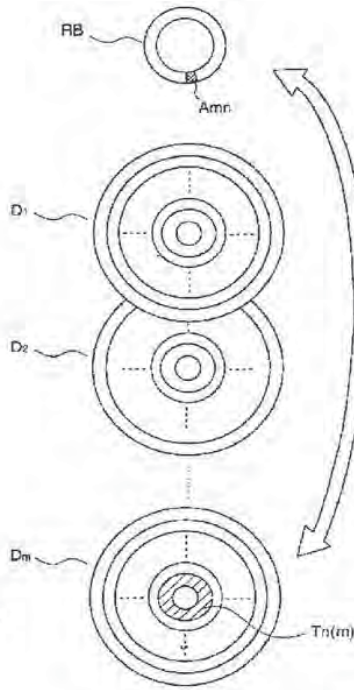
【図57】



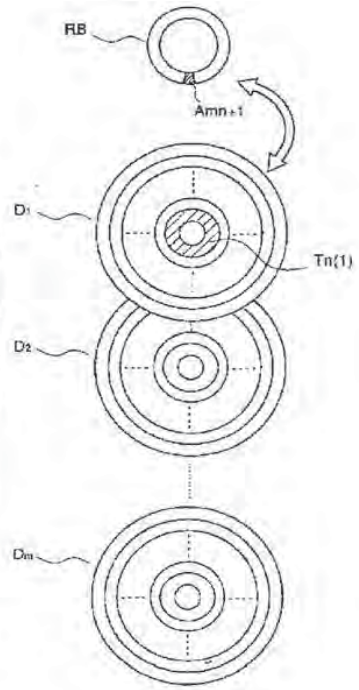
【図54】



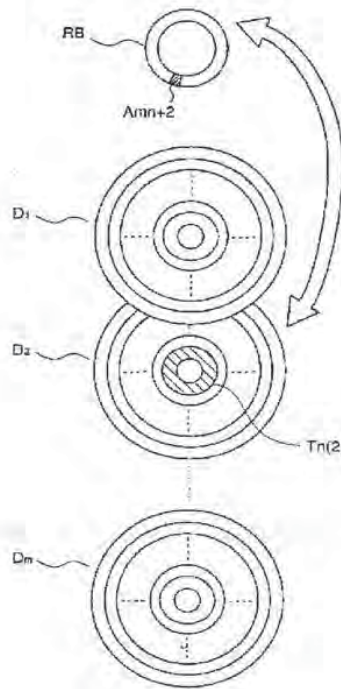
【図60】



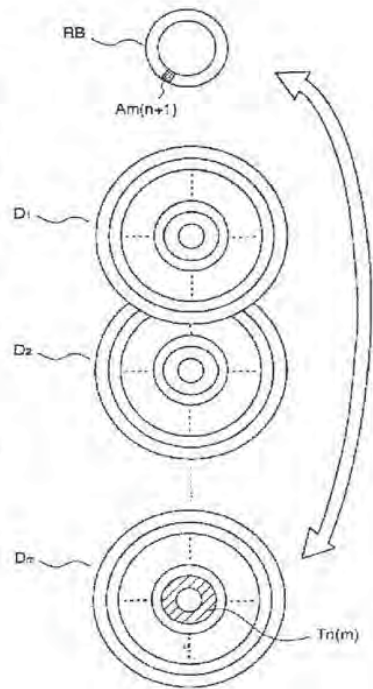
【図61】



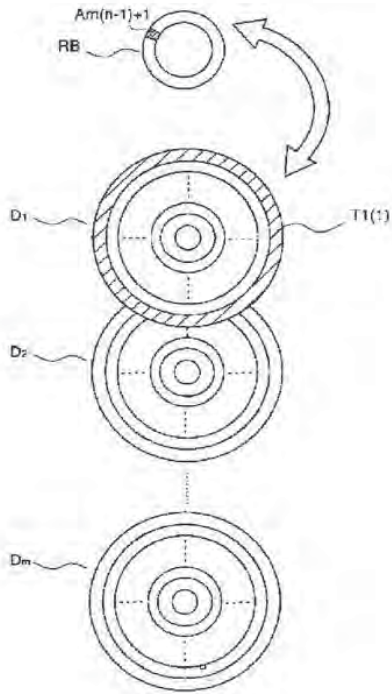
【図62】



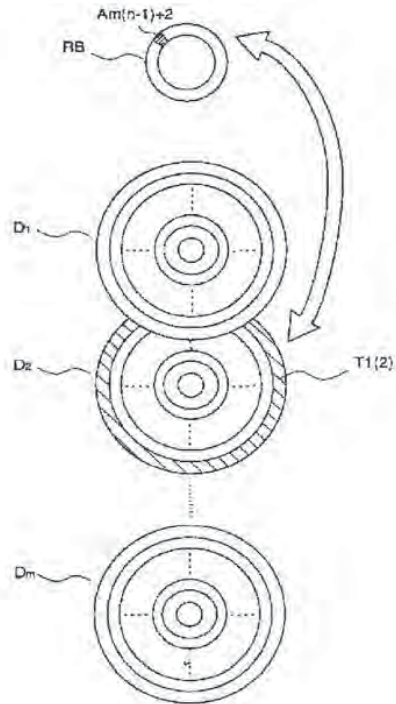
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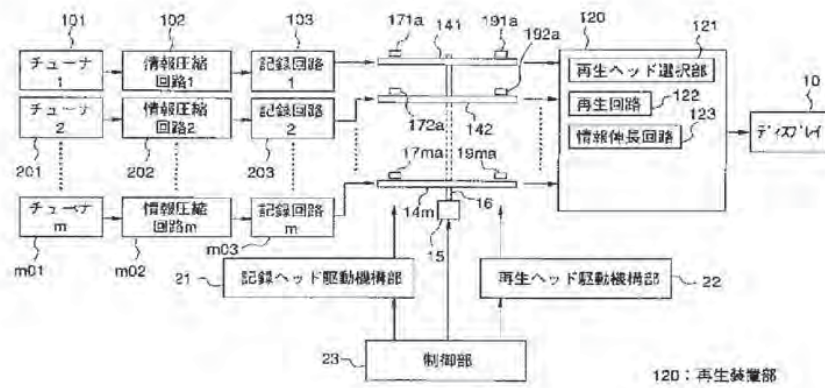
【図64】



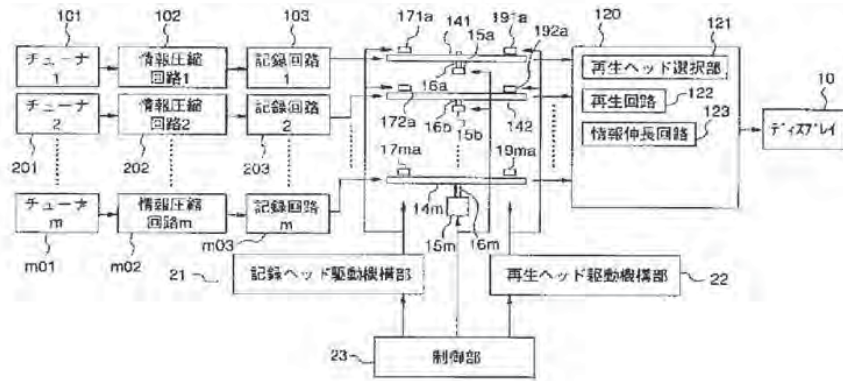
【図65】



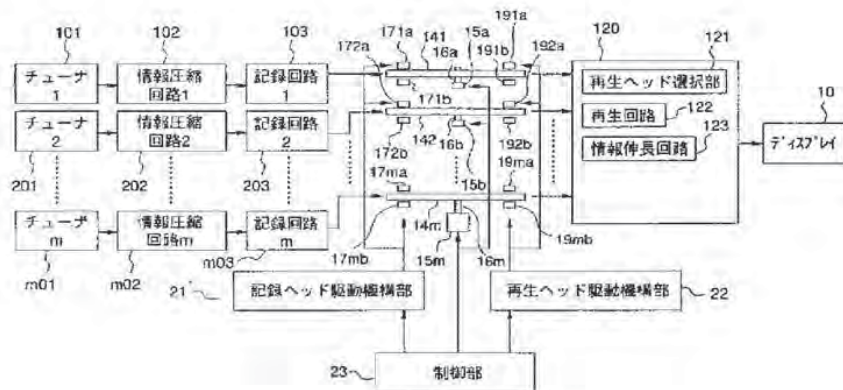
【図67】



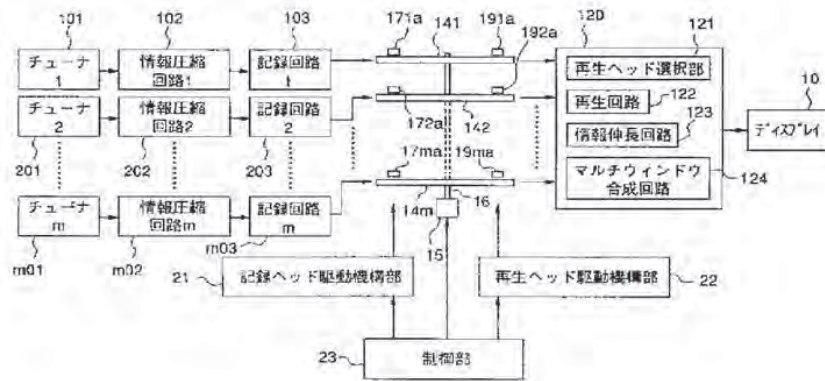
【図69】



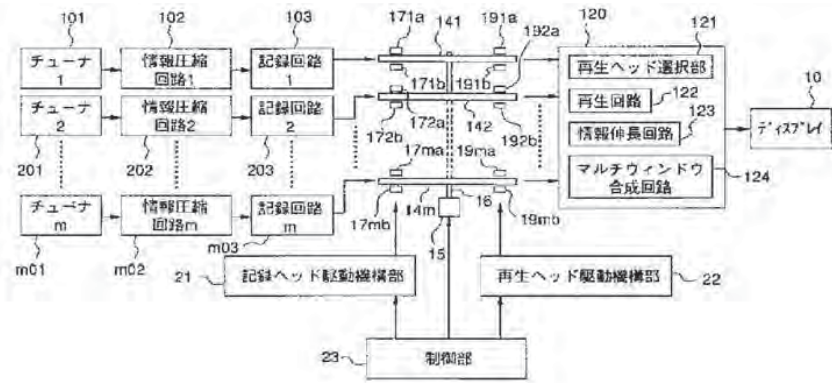
【図70】



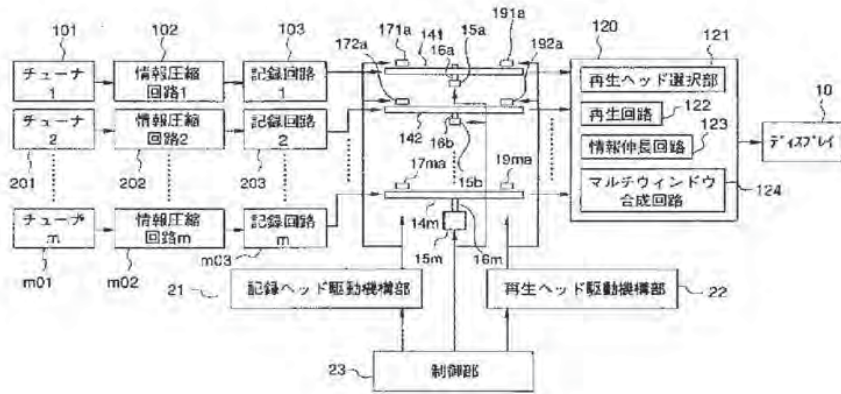
【図71】



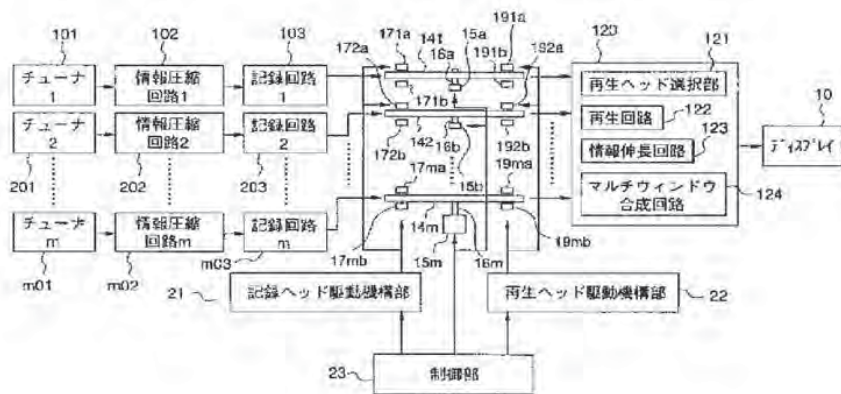
【図72】



【図73】



【図74】



フロントページの続き

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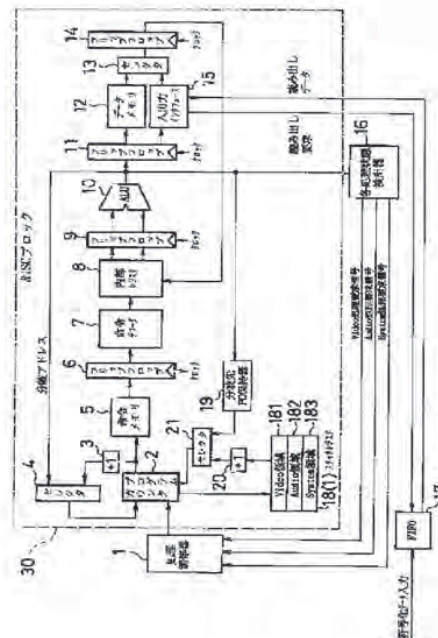
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(54) 【発明の名称】 RISC型データ処理装置及び方法

(57) 【要約】

【課題】 パイプライン処理時に発生する条件分岐ハザードをパイプラインを崩さずに無くすか、或いは著しく低減させること。

【解決手段】 処理調停器1は映像処理要求信号、音声処理要求信号及びシステム処理要求信号の入力に応じて、プログラムカウンタ2を制御し、RISCブロック30で処理する符号化データの種別を1サイクル毎に切り換える制御を行っている。これにより、ある種類の符号化データの処理時に条件分岐が発生しても、次のサイクルで、RISCブロック30は別の種類の符号化データを処理するため、条件分岐ハザードは生じない。しかも、複数の処理がパイプライン処理を崩さずに行われるため、RISCブロック30の処理効率を著しく向上させることができる。



【特許請求の範囲】

【請求項1】 複数の処理データを単一RISCでパイプライン処理することにより復号するRISC型データ処理装置において、

前記複数の処理データを復号する際に処理データを前記RISC処理の1サイクル毎に切り換えることにより、同一種類の処理データが連続して処理されないように制御する制御手段を備えたことを特徴とするRISC型データ処理装置。

【請求項2】 プログラムカウンタ値をN個以上保存する保存手段と、

前記複数の処理データの実行を個々に要求するN個の処理要求の有無状態を検出する検出手段と、

この検出手段により検出されるN個の処理要求信号を入力とし、前記N個の処理要求の中から一つの処理をRISC処理の1サイクルで処理するように調停する処理調停手段と、

この処理調停手段により出力された処理識別信号により前記保存手段により保存されているプログラムカウンタ値を現在のプログラムカウンタ値として設定する設定手段とを備えたことを特徴とする請求項1記載のRISC型データ処理装置。

【請求項3】 前記処理調停手段は入力されるN個の処理要求信号の中で、同時に2つ以上のデータの処理要求がある場合には、RISC復調処理の1サイクル毎に異なる処理データを処理するように調停することを特徴とする請求項2記載のRISC型データ処理装置。

【請求項4】 外部から入力する複数の処理データを単一RISCでパイプライン処理することにより復号するRISC型データ処理装置において、

前記外部からの処理データを前記RISC処理の1サイクル毎に切り換えて同一の処理データが連続して入力されないようにする入力制御手段と、

前記入力制御手段により入力される処理データを前記RISC復号処理の1サイクル毎に処理するようにして、同一種類の処理データが連続して処理されないように制御する制御手段とを備えたことを特徴とするRISC型データ処理装置。

【請求項5】 外部から入力する複数の処理データを単一RISCでパイプライン処理することにより復号するRISC型データ処理装置において、

前記外部からの処理データを前記RISC復号処理の1サイクル毎に切り換えて同一の処理データが連続して前記RISC型データ処理装置に出力されないように処理データを該RISC型データ処理装置に送出するデータ送出手段と、

このデータ送出手段により出力される処理データを前記RISC処理の1サイクル毎に処理するようにして、同一種類の処理が連続して処理されないように制御する制御手段とを備えたことを特徴とするRISC型データ処

理装置。

【請求項6】 複数の処理データを単一RISCでパイプライン処理することにより復号するRISC型データ処理方法において、

前記複数の処理データを復号する際に処理データを前記RISC処理の1サイクル毎に切り換えることにより、同一種類の処理データが連続して処理されないように制御する制御過程を含むことを特徴とするRISC型データ処理方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、N個の処理をパイプライン処理するRISC (Reduced Instruction Set Computer) 型データ処理装置及び方法に係り、特に条件分岐ハザードを抑制する構成及び方法に関する。

【0002】

【従来の技術】従来のRISC型データ処理装置は、例えば特開平6-274352「コンパイラ及びデータ処理装置」などがあり、この従来例もRISC (Reduced Instruction Set Computer) アーキテクチャの処理において、条件分岐命令が引き起こすパイプラインハザードを低減させる公知例である。

【0003】この従来例では、まず、コンパイルの際にコード生成手段において命令の並び替えなどにより、オブジェクトプログラムの最適化を行う。例えば分岐命令の高速化を目的に遅延分岐の遅延スロットに前後の適当な命令を挿入し、適当な命令がない場合にはノーオペレーションの命令コードを含む命令（以下NOP命令とする）を挿入する。このNOP命令を挿入する際に分岐命令に応じてどの命令の次に置かれるNOPかを示すフラグを付けておく。

【0004】次にデータ処理装置においてはNOP命令の実行ステージEXで分岐先アドレス計算を行い、その結果を分岐先アドレスレジスタ (BTAR) に保持する。これらのことにより条件分岐により生じる分岐ハザードを3クロックから2クロックに減らすことができる。しかし、従来例では上記の様に分岐ハザードを低減してはいるが、せいぜい3クロックから2クロックに低減する程度でしかなく、大幅な性能向上に寄与することはできなかった。

【0005】

【発明が解決しようとする課題】従来のRISC型データ処理装置では、RISC処理を高速化させるため、1つの命令を実行する間に次の命令を取り出すパイプライン処理を行っているが、条件分岐命令は、命令を処理した後でない次の命令が判明しないので、条件分岐成立時は、既に取り出していた次の命令をNOPにするため、数サイクル分、命令の実行ロスが生じるという不具合があった。

【0006】本発明は、上述の如き従来の課題を解決す

るためになされたもので、その目的は、複数の処理データをパイプライン処理する際に生じる条件分岐ハザードを無くすか、或いは著しく低減させることができるRISC型データ処理装置及び方法を提供することである。

【0007】

【課題を解決するための手段】上記目的を達成するために、本発明の特徴は、複数の処理データを単一RISCでパイプライン処理することにより復号するRISC型データ処理装置において、前記複数の処理データを復号する際に処理データを前記RISC処理の1サイクル毎に切り換えることにより、同一種類の処理データが連続して処理されないように制御する制御手段を備えたことである。

【0008】この発明によれば、複数の処理データは映像、音声、システムなどのデータであった場合、サイクル毎に映像、音声、システムデータが順次パイプライン処理される。従って、ある処理データ、例えば映像データをパイプライン処理する際に、条件分岐が生じても、次の復号処理サイクルは前回と異なる処理データ、例えば音声データであるため、条件分岐の分岐先が分からない時点でも、前記音声データをパイプライン処理することができるため、条件分岐ハザードが生ぜず、且つパイプライン処理が崩れることがない。

【0009】

【発明の実施の形態】以下、本発明の実施の形態を図面に基いて説明する。図1は、本発明のRISC型データ処理装置の第1の実施の形態を示したブロック図である。RISCブロック30はプログラムカウンタ2の出力をアドレスとして命令メモリ5から命令を読み出し、読み出された命令はフリップフロップ6を経由して命令デコーダ7で命令を解釈され、解釈された命令の種類によって以降に存在する内部レジスタ8、フリップフロップ9、ALU10、フリップフロップ11及びデータメモリ12などの回路により各種処理を行う回路である。

【0010】また、プログラムカウンタ2は+1回路3によりカウントアップされることでアドレスがカウントアップし、次の命令を読み出すように制御されている。更に、セクタ4は通常+1回路3側が選択されており、条件分岐がある場合に分岐アドレス信号側に切り替わって、分岐先アドレスを示すようになっており、順次命令が実行できるようにプログラムカウンタ2が制御される。

【0011】更に入出力インターフェース15はFIFO17に対して、信号の入出力を行う。入出力インターフェース15により入力された信号はセクタ13、フリップフロップ14を通して内部レジスタ8に記憶される。各処理状態検出器16はALU10の出力から各処理状態を検出し、各種処理要求信号を処理調停器1に出力する。

【0012】処理調停器1はプログラムカウンタ2のプ

ログラムカウンタ値を調整する。スタックレジスタ18はプログラムカウンタ2のプログラムカウンタ値を保持し、セクタ21は-1回路20でスタックレジスタ18に保持されたプログラムカウンタ値に+1した値を選択するか、分岐先PC保持器19に保持された値を選択して、プログラムカウンタ2にセットする。分岐先PC保持器19はALU10の出力より分岐先のプログラムカウンタ値を保持する。

【0013】次に本実施の形態の動作について説明する。まず、RISCブロックで符号化信号をデコードする方法について説明する。符号化された映像信号及び音声信号（以下、符号化信号という）は図示されない入力ポートから入力され、入力符号化信号クロックから内部処理クロックに変換するためのFIFO17に蓄積される。

【0014】次にRISCブロック30の命令メモリ5から命令が読み出され、命令デコーダ7で解釈した結果、符号化信号を取り込む命令であると、これにより、RISCブロック30が制御され、入出力インターフェース15からFIFO17にデータ読み出し要求信号が出力される。これにより、FIFO17から読み出された符号化信号は入出力インターフェース15からRISCブロック30に入力され、符号化信号がRISCブロック30に取り込まれる。この入出力インターフェース15はメモリと同様なアドレスがマッピングされており、このアドレスにより符号化信号を取り込むようになっているメモリマップド入出力形式となっている。

【0015】入出力インターフェース15から取り込まれた信号はセクタ13とフリップフロップ14を経て内部レジスタ8に取り込まれる。RISCブロック30は入力符号化信号に映像信号と音声信号に分離するシステムデコード処理を施した後、映像デコード処理及び音声デコード処理を施し、各デコードは上記の如く入出力インターフェース15で取り込んだ信号に対して、命令メモリ5から読み出される命令によって順次行われる。

【0016】その際、各デコードはその符号化信号の種類により、それぞれRISCブロック30での処理が必要となる。例えば入力された符号化信号を映像信号と音声信号とに分離するシステムデコードは符号化信号が入力される毎に実行され、入力されない場合は処理を行わない。またシステムデコードにより分離された例えば映像信号は、表示単位時間内に表示単位ユニットのデコードが施される。表示単位ユニットが表示単位時間より早くデコード終了してしまえば、残りの時間はデコードが停止される。

【0017】このような各デコードの処理要求は図2に示したように、それぞれ独立の処理時間を必要とする。例えば、図2中、時間(1)では映像デコードとシステムデコード処理要求が発生し、時間(2)では映像デコードと音声デコードとシステムのデコードの処理要求が

発生し、時間(3)ではシステムデコードだけが処理要求を発生している。

【0018】図2のような各処理の要求の有無は、各処理がALU10で演算された内部信号の状態によって分かる。このため、ALU10の出力及び命令レコーダ7から出力される命令が各処理状態検出器16へ入力され、各処理の有無状態を検出する。この各処理状態検出器16は前記検出結果に応じて、映像(Video)処理要求信号、音声(Audio)処理要求信号及びシステム(System)処理要求信号を処理調停器1に出力する。これらの処理要求信号の出力タイミングは図2に示した各処理要求タイミングと同様である。

【0019】次に各処理要求信号は処理調停器1へ入力され、各処理をRISCブロック30で行う命令を調停し、どの処理の命令を取り出すかを決定し、この決定に基づいてプログラムカウンタ2を制御する。例えば、各処理状態検出器16から映像処理要求信号と音声処理要求信号が出されている場合、処理調停器1はプログラムカウンタ2に、例えば交互に映像処理と音声処理が行われるようなプログラムカウンタ値をセットするような制御を行う。

【0020】この際、プログラムカウンタ2は現在デコード処理している命令と異なるデコード処理の命令が処理調停器1より与えられた場合、現在処理しているプログラムカウンタ値をスタックレジスタ18に一時的に待避する。その後、処理調停器1より与えられた次に処理するデコード処理の命令をスタックレジスタ18の別の場所から取り出し、これに+1回路20で+1した値をセクタ21で選択してプログラムカウンタ2に供給する。

【0021】即ち、映像処理している時に、処理調停器1により、プログラムカウンタ2に音声処理が行われるようなプログラムカウンタ値がセットされると、映像処理の最後のカウンタ値がスタックレジスタ18の映像処理領域181に格納される。その後、スタックレジスタ18の音声処理領域182に格納されているプログラムカウンタ値を+1回路20で+1し、これをセクタ21で選択してプログラムカウンタ2にセットする。その後、プログラムカウンタ2にセットされたプログラムカウンタ値が命令メモリ5に格納され、RISCブロック30による音声データのデコード処理が開始される。

【0022】ところで、処理調停器1によりデコード処理が切り替えられる前の処理の命令が条件分岐命令であった場合、命令デコーダ7では、次の分岐アドレスは分からず、ALU10がデータを処理した時点で判明するので、この分岐先のプログラムカウンタ値を分岐先PC保持器19で保持しておき、次にその処理が呼ばれた際にセクタ21を切り替えて、分岐先PC保持器19側のプログラムカウンタ値をプログラムカウンタ2にセットして使用する。

【0023】次に上記動作について図3の動作タイムチャートを参照して更に詳述する。本図はRISCブロック30でのパイプラインステージを示した動作図である。但し、図中、Vは映像データ処理命令を、Aは音声データ処理命令を、Sはシステムデータ処理命令を示しているものとする。この例は、命令フェッチIF、デコードID、実行EX、メモリアクセスMA、書き込みWBの各ステージから成る。cmd1はシステムデコード処理の命令であり、命令フェッチされた後、各ステージへ進む。

【0024】次に、処理調停器1から映像デコード処理の命令を取り出すように指示される。この際、cmd1を命令フェッチした時のプログラムカウンタ値をスタックレジスタ18のシステム領域183に待避させ、映像デコード用のプログラムカウンタ値をスタックレジスタ18の映像処理領域181から取り出し、+1回路20及びセクタ21を介してプログラムカウンタ2にセットすることにより、命令をフェッチする。

【0025】そして、前記映像デコード処理の命令が条件分岐だった場合、デコードして実行した時点で、即ち、ALU10の出力で分岐先プログラムアドレスを知り、これが分岐先PC保持器19に保持される。

【0026】ところで、図3中、次の命令cmd3が映像デコードの命令と異なる命令の場合(図中、音声デコード)、その前の命令である映像の条件分岐命令とは独立に実行可能である。また、その次の命令cmd4も映像デコード命令と異なる命令の場合(図3中、システムデコード)もそのまま実行可能である。次に映像デコードの条件分岐命令が実行されると、分岐先PC保持器19に分岐先のPCアドレスが保持され、cmd5として映像デコードの命令が処理調停器1により選択された場合、セクタ21は分岐先PC保持器19を選択し、cmd5をプログラムカウンタ2にセットすることにより命令フェッチして、RISCブロック30により分岐先の処理を実行する。

【0027】本実施の形態では、処理調停器1は複数の処理要求がある場合、命令サイクルを1サイクル毎に、例えば映像命令、音声命令、システム命令というように切り替えているため、条件分岐命令が図3のパイプライン動作に示すように途中に存在した場合にも、次のサイクルは別の処理要求を実行するため、パイプラインを乱すことなく、全ての処理がパイプラインの中で実行可能であり、条件分岐命令によるパイプラインハザードをなくしたり、或いはこれを著しく低減することができる。従って、RISCブロック30の実行サイクルを遅らせる主要原因の一つであるパイプラインハザードがなくなるか、低減することにより、前記実行サイクルを大幅に短縮化することができ、RISC型データ処理装置の性能を大きく向上させることができる。

【0028】図4は本発明のRISC型データ処理装置

の第2の実施の形態を示したブロック図である。但、図1の実施の形態に対応する部分は同一符号を用いて、適宜説明を省略する。本例はスタックレジスタが、スタックレジスタ18(1)、18(2)、18(3)と3個用意され、入力有効信号(1)、(2)、(3)に対応して使用されるようになっている。他の構成は図1に示した第1の実施の形態と同様である。

【0029】尚、各スタックレジスタ2の領域181～183にプログラムカウンタ値を保存する動作は基本的には図1で説明した動作と同じで、単に処理している信号の違いにより、使用するスタックレジスタが異なるだけである。

【0030】次に本実施の形態の動作について図5を参照して説明する。複数の番組が時分割で入力される場合に、これを1サイクル毎に切り替えて処理する場合について説明する。本例の処理調停器1は入力要求信号(1)～(3)を図5(A)、(B)、(C)に示すように図示されないデータ送信元へ出力する。これに応じて、データ送信元は図5(D)、(E)、(F)に示すようにFIFO17へ入力有効信号(1)～(3)を出力(アクティブにするに同じ)する。入力有効信号(1)～(3)は図5(G)で示したテレビなどの番組(1)、番組(2)、番組(3)に対応している。

【0031】処理調停器1は第1の実施の形態で示したようにRISCブロック30への命令を1サイクル毎に切り替えるように、入力要求信号(1)～(3)を出力する。入出力インターフェース15は、この入力要求信号に従い、FIFO17から符号化データを入力する。例えば入力要求信号(1)がアクティブになると、データ送信元は入力有効信号(1)をアクティブにして番組(1)の符号化データを次のサイクルでFIFO17へ出力し、また入力要求信号(2)がアクティブになると、入力有効信号(2)をアクティブにして、番組(2)の符号化データを次のサイクルでFIFO17へ出力する。

【0032】このように1サイクル毎に入力番組の種類を切り替えて要求することにより、RISCブロック30では1サイクル毎に異なる番組が入力されて、順次処理される。

【0033】本実施の形態によれば、処理調停器1は複数の外部信号処理がある場合、命令サイクルを1サイクル毎に、前記入力信号を例えば番組(1)、番組(2)、番組(3)というように切り替えているため、パイプライン処理時に条件分岐命令が途中で存在した場合にも、次のサイクルは別の番組の信号処理を実行することができるので、パイプライン処理を崩すことなく処理が続行され、図1に示した第1の実施の形態と同様の効果がある。

【0034】図6は本発明のRISC型データ処理装置の第3の実施の形態を示したブロック図である。但し、図4の実施の形態に対応する部分は同一符号を用いて、

適宜説明を省略する。本例もスタックレジスタが、スタックレジスタ18(1)、18(2)、18(3)と3個用意され、入力有効信号(1)、(2)、(3)に対応して使用されるようになっている。又、本例は処理調停器1から1個の入力要求信号が図示されないデータ送信元へ送られ、この要求によって入力有効信号(1)、(2)、(3)のいずれかが前記データ送信元からFIFO17へ出力される。他の構成は図4に示した第2の実施の形態と同様である。

【0035】次に本実施の形態の動作について図7のタイミングチャートを参照して説明する。本装置は複数の番組が時分割で入力される場合に、これを1サイクル毎に切り替えて処理する。本例の処理調停器1は一つの入力要求信号を図7(A)に示すように図示されないデータ送信元へ出力する。これに応じて、データ送信元は図7(B)、(C)、(D)に示すように入力有効信号(1)～(3)のいずれかをFIFO17へ出力する。入力有効信号(1)～(3)は図7(G)に示すようにテレビなどの番組(1)、番組(2)、番組(3)に対応しているが、この例では入力有効信号(1)～(3)の入力順はデータ送信元任せになっている。但し、データ送信元は同一番組の符号化データを連続して出力することはないものとする。

【0036】処理調停器1は入力要求信号を出力すると、データ送信元が図7(B)に示すように、例えば入力有効信号1をアクティブとして、これに関する符号化データを送ってくると、この符号化データがFIFO17を介して入出力インターフェース15によりRISCブロック30内に取込まれる。即ち、入力要求信号がアクティブになると、入力有効信号(1)がアクティブになり、FIFO17に番組1の符号化データが次のサイクルで入力され、次に入力要求信号(2)がアクティブになると、FIFO17に番組(2)の符号化データが次のサイクルで入力される。

【0037】このように1サイクル毎に入力される番組が異なるため、RISCブロック30では異なる番組の処理を1サイクル毎に処理する。

【0038】本実施の形態によれば、処理調停器1は複数の入力信号処理がある場合、命令サイクルを1サイクル毎に、例えば番組(1)、番組(2)、番組(3)、番組(2)というように切り替えているため、パイプライン処理時に条件分岐命令が途中で存在した場合にも、次のサイクルは別の番組の入力信号処理を実行することができるため、図1に示した第1の実施の形態と同様の効果がある。

【0039】また、図8はMPEG2のシステムレイヤであるTransport Stream(以下TS)を示した図である。TSは図5又は図7で示した各番組と同じ様に複数のパケットが188バイトのパケットサイズで時分割多重化されている。このようなTSに対応

するためには上記した第2、第3の実施の形態で示したRISCブロック30での命令の切り替えを188バイトパケット毎に切り替えることにより、対応が可能である。

【0040】以上説明した実施の形態1〜3では複数の処理を一つのRISCで処理する具体的な説明として符号化された映像及び音声信号をデコードする処理について説明したが、処理のアプリケーションとしてこれらに捕らわれるものではない。

【0041】

【発明の効果】以上詳細に説明したように、本発明のRISC型データ処理装置及び方法によれば、複数の処理データを1サイクル毎に切り換えて、連続して同一の処理データが復号化されないようにしてパイプライン処理することにより、条件分岐ハザードをパイプライン処理を崩さずに著しく低減させることができ、装置全体の処理効率を大幅に向上させることができる。

【図面の簡単な説明】

【図1】本発明のRISC型データ処理装置の第1の実施の形態を示したブロック図である。

【図2】図1のRISCブロックの内部処理の要求タイ

ミングを示したタイミングチャートである。

【図3】図1のRISCブロックでのパイプライン処理動作を示したタイミングチャートである。

【図4】本発明のRISC型データ処理装置の第2の実施の形態を示したブロック図である。

【図5】図4に示した処理調停器の入力要求信号とFIFOに入力される入力有効信号との関係を示したタイミングチャートである。

【図6】本発明のRISC型データ処理装置の第3の実施の形態を示したブロック図である。

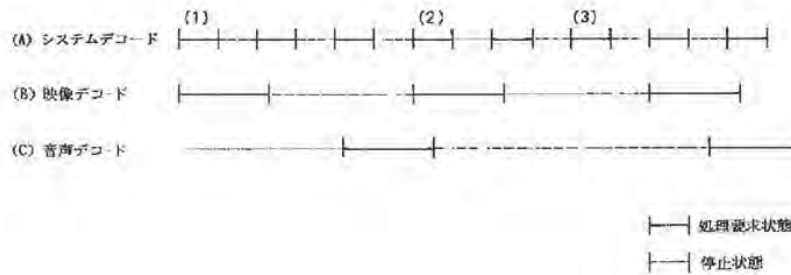
【図7】図6に示した処理調停器の入力要求信号とFIFOに入力される入力有効信号との関係を示したタイミングチャートである。

【図8】MPEG2のシステムレイヤであるTransport Streamを示した図である。

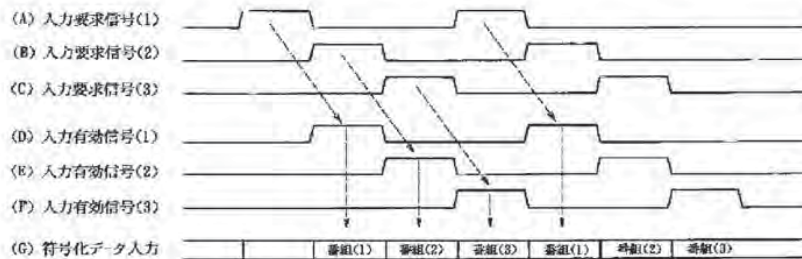
【符号の説明】

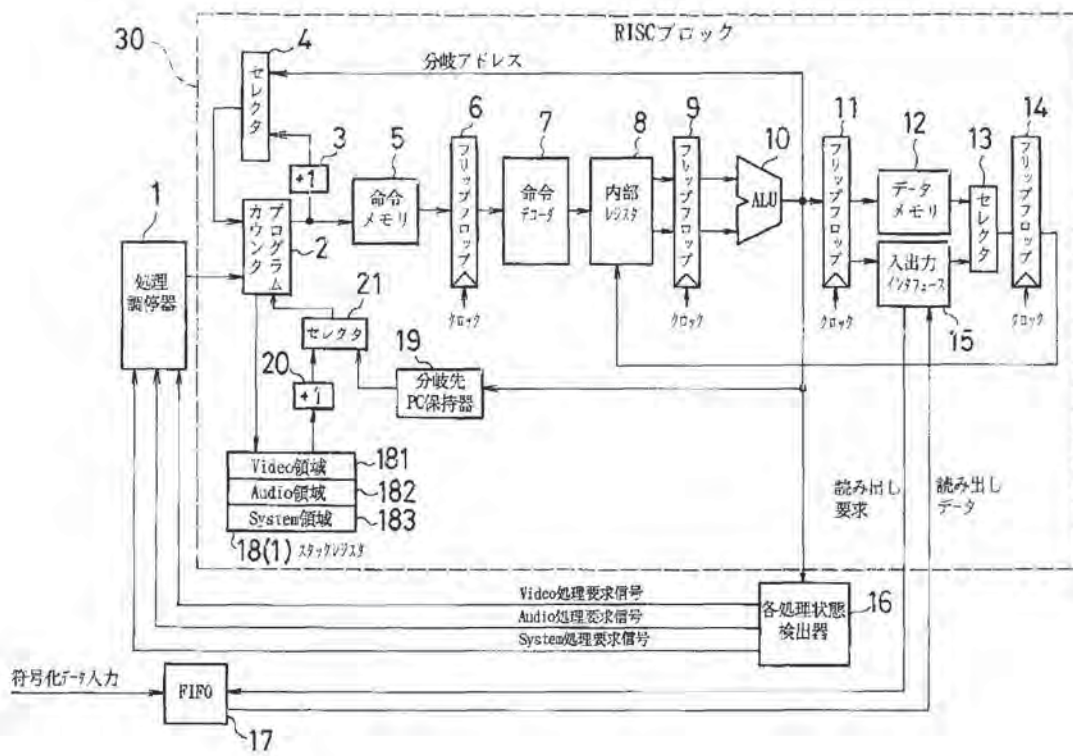
1…処理調停器、2…プログラムカウンタ、15…入出力インターフェース、16…各処理状態検出器、17…FIFO、18(1)〜18(3)…スタックレジスタ、19…分岐先PC保持器、30…RISCブロック。

【図2】



【図5】

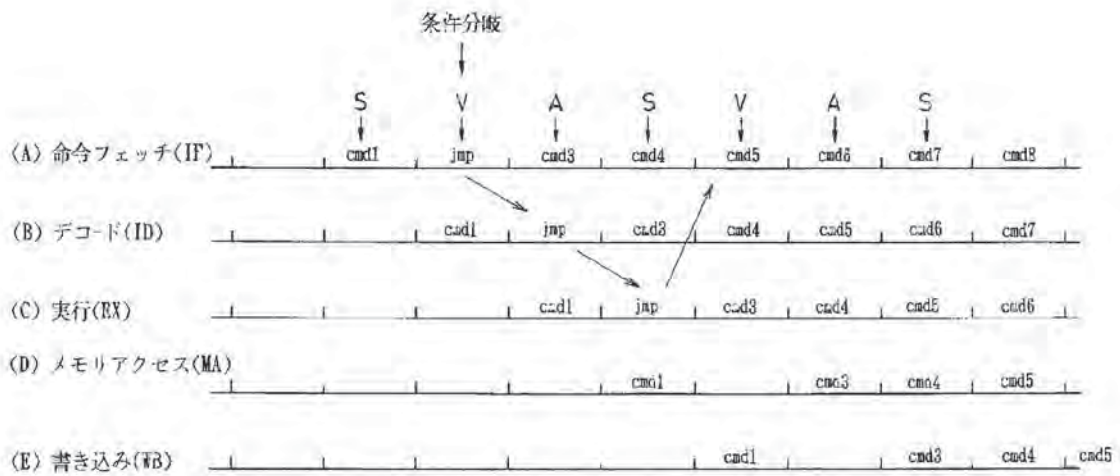




【図1】

(7)

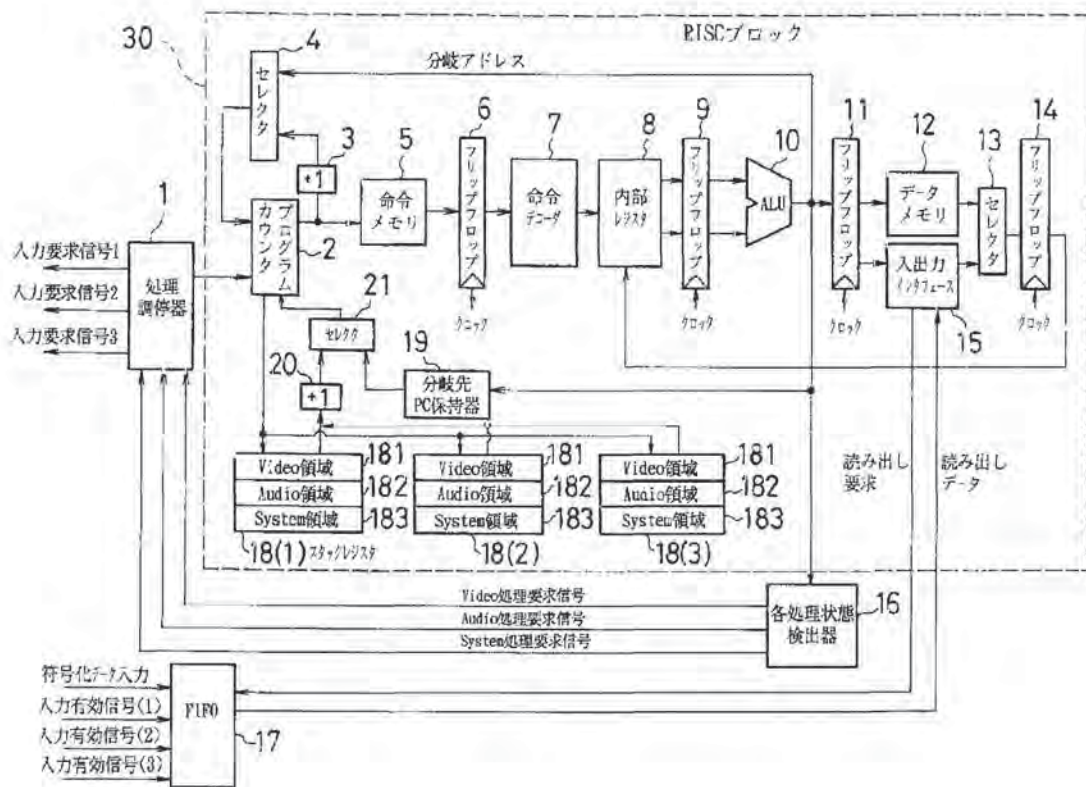
特開平11-203135



【図3】

(8)

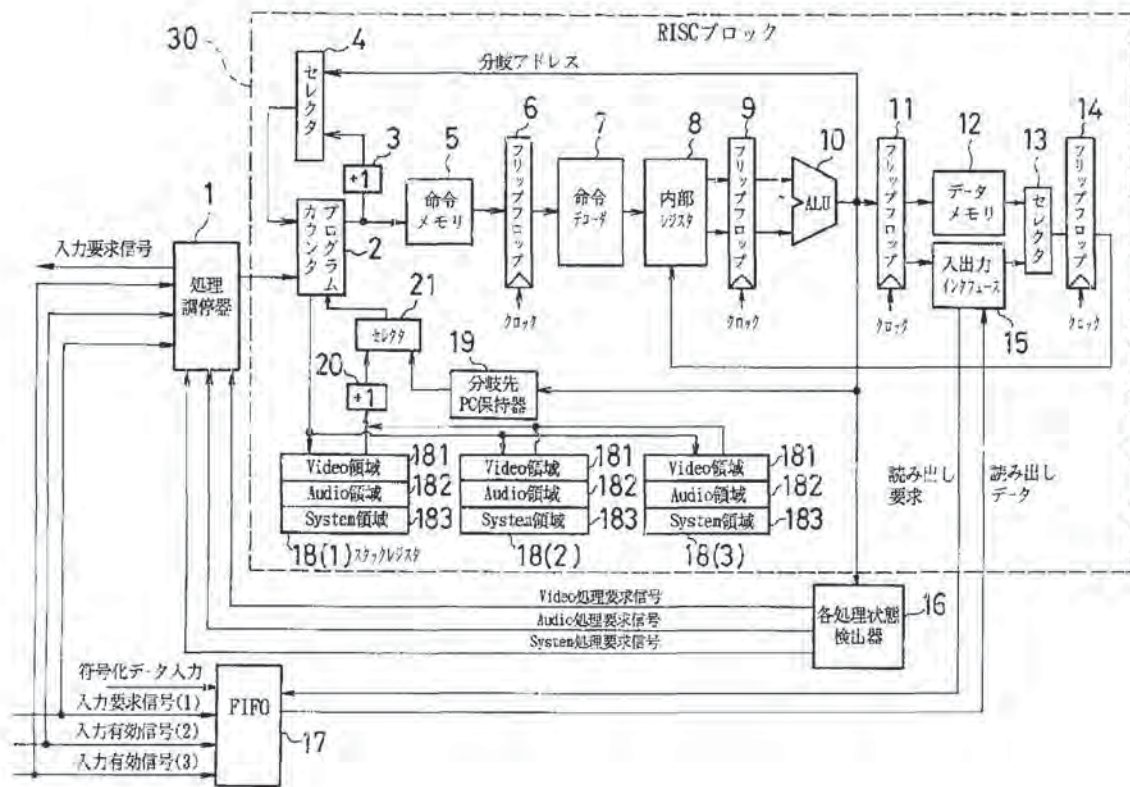
特開平11-203135



【図4】

(9)

特開平11-203135

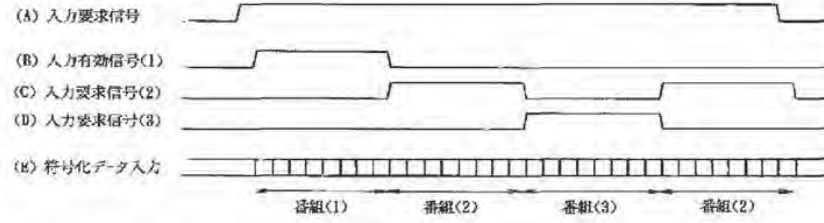


【図6】

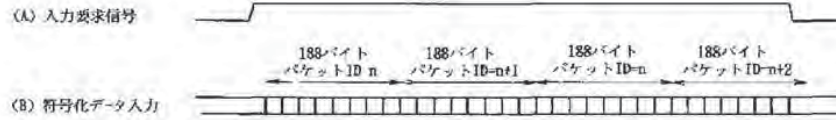
(10)

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【図7】



【図8】



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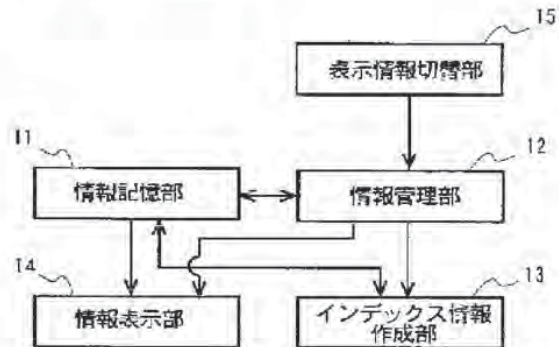
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(54) 【発明の名称】 多重情報記録再生装置、及びそのインデックス情報の作成方法

(57) 【要約】

【課題】 複数の動画像情報を含んだ多重情報が情報記憶部に記憶されている場合でも、その多重情報から所望の情報を容易に検索して再生すること。

【解決手段】 映像情報及び音声情報を含む複数の情報を記憶した情報記憶部と、複数の各情報の記録位置やデータサイズを含む管理情報を管理する情報管理部と、管理情報を用いて情報記憶部に記憶されている各情報からインデックス情報を作成するインデックス情報作成部と、情報記憶部に記憶されている各情報の表示再生を行う情報表示部と、表示されている情報の切り替えを指示する表示情報切替部とを備え、情報記憶部が動画像情報を記憶している場合、インデックス情報作成部は動画像情報の画像のうち、所定時間分の画像が動画像メニュー情報として情報表示部で表示再生されるようインデックス情報を作成する。



【特許請求の範囲】

【請求項1】 映像情報及び音声情報を含む複数の情報を記憶した情報記憶部と、前記複数の各情報の記録位置やデータサイズを含む管理情報を管理する情報管理部と、前記管理情報を用いて前記情報記憶部に記憶されている各情報からインデックス情報を作成するインデックス情報作成部と、前記情報記憶部に記憶されている各情報の表示再生を行う情報表示部と、表示されている情報の切り替えを指示する表示情報切替部とを備え、前記情報記憶部が動画画像情報を記憶している場合、前記インデックス情報作成部は前記動画画像情報の画像のうち、所定時間分の画像が動画画像メニュー情報として前記情報表示部で表示再生されるようインデックス情報を作成する、ことを特徴とする多重情報記録再生装置。

【請求項2】 前記インデックス情報作成部が、DVD-Video規格に規定されたマルチアングル機能を利用して、インデックス情報を作成することを特徴とする請求項1に記載の多重情報記録再生装置。

【請求項3】 前記インデックス情報作成部が、前記情報管理部の管理情報に基づき動画画像メニュー情報として必要なデータの判定を行う管理情報判定部と、前記管理情報判定部で判定されたデータに基づき前記情報記憶部に記憶されている各情報の表示サイズやフォーマットを変換する情報変換部と、前記情報変換部で変換された変換後情報を記憶する変換後情報記憶部と、前記管理情報判定部で判定されたデータに基づいて、前記情報記憶部に記憶されている情報に接続するためのメニュー接続情報を作成するメニュー接続情報作成部と、複数の前記変換後情報をフレーム単位で合成して前記メニュー接続情報と関連付けた合成情報を作成する情報合成部と、前記情報合成部で作成された複数フレーム分の合成情報を一つの動画画像メニュー情報としてまとめる動画画像メニュー情報作成部とを備えたことを特徴とする請求項1に記載の多重情報記録再生装置。

【請求項4】 前記インデックス情報作成部が、前記情報管理部の管理情報に基づき動画画像メニュー情報として必要なデータの判定を行う管理情報判定部と、前記管理情報判定部で判定されたデータに基づき前記情報記憶部に記憶されている各情報の表示サイズをフレーム単位に縮小する縮小画像作成部と、前記縮小画像作成部で縮小された縮小画像を記憶する縮小画像記憶部と、前記管理情報判定部で判定されたデータに基づいて、前記情報記憶部に記憶されている情報に接続するためのメニュー接続情報を作成するメニュー接続情報作成部と、複数の前記縮小画像をフレーム単位で合成して前記メニュー接続情報と関連付けた合成情報を作成する縮小画像合成部と、前記縮小画像合成部で作成された複数フレーム分の合成情報を一つの動画画像メニュー情報としてまとめる動画画像メニュー情報作成部とを備えたことを特徴とする請求項1に記載の多重情報記録再生装置。

【請求項5】 前記インデックス情報作成部が、前記情報管理部の管理情報に基づき動画画像メニュー情報として必要なデータの判定を行う管理情報判定部と、前記管理情報判定部で判定されたデータに基づき前記情報記憶部に記憶されている各情報の表示サイズの変更とデータ圧縮変換を行う情報圧縮部と、前記情報圧縮部で圧縮変換された情報を記憶する圧縮情報記憶部と、前記圧縮変換された情報の記録位置情報及びそのデータ圧縮率やデータサイズを示す圧縮情報を管理する圧縮情報管理部と、前記管理情報判定部で判定されたデータに基づいて、前記情報記憶部に記憶されている情報に接続するためのメニュー接続情報を作成するメニュー接続情報作成部と、複数の前記圧縮変換された情報をフレーム単位で合成して前記メニュー接続情報と関連付けた合成情報を作成する圧縮情報合成部と、前記圧縮情報合成部で作成された複数フレーム分の合成情報を一つの動画画像メニュー情報としてまとめる動画画像メニュー情報作成部とを備えたことを特徴とする請求項1に記載の多重情報記録再生装置。

【請求項6】 前記情報圧縮部と前記情報記憶部との間に接続され、その情報記憶部に記憶されている情報のデータ圧縮率やデータサイズを判定する圧縮情報判定部を設けたことを特徴とする請求項5に記載の多重情報記録再生装置。

【請求項7】 映像情報及び音声情報を含む複数の情報を記憶した情報記憶部と、前記複数の各情報の記録位置やデータサイズを含む管理情報を管理する情報管理部と、前記管理情報を用いて前記情報記憶部に記憶されている各情報からインデックス情報を作成するインデックス情報作成部と、前記情報記憶部に記憶されている各情報の表示再生を行う情報表示部と、表示されている表示情報の切り替えを指示する表示情報切替部と、前記表示情報に対応した音声情報を選択し再生するための音声管理部とを備え、

前記情報記憶部が動画画像情報を記憶している場合、前記インデックス情報作成部は前記動画画像情報の画像のうち、所定時間分の画像が動画画像メニュー情報として前記情報表示部で表示再生されるようインデックス情報を作成し、さらに前記音声管理部が表示再生された動画画像メニュー情報に対応した音声情報を選択する、ことを特徴とする多重情報記録再生装置。

【請求項8】 複数の情報からなる多重情報を記録した多重情報記録再生装置のインデックス情報の作成方法であって、

前記多重情報に含まれた動画画像情報の画像のうち、所定時間分の画像が動画画像メニュー情報として表示再生されるようにインデックス情報を作成することを特徴とするインデックス情報の作成方法。

【請求項9】 前記動画画像メニュー情報を表示再生するとき、その動画画像メニュー情報に対応した音声情報が選択され再生されることを特徴とする請求項8に記載のインデ

ックス情報の作成方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、デジタル形式の多重情報を記録媒体に記録し再生する多重情報記録再生装置、及びそのインデックス情報の作成方法に関する。

【0002】

【従来の技術】近年、デジタル情報分野では、文字情報、映像情報、及び音声情報等の複数の情報を多重化した多重情報を処理することが一般的になってきている。このような処理を行う機器には、CD (Compact Disk) やDVD (Digital Versatile Disk) などの記録媒体に多重情報を記録し再生する多重情報記録再生装置が知られている。

【0003】以下、図11を参照して、従来の多重情報記録再生装置について具体的に説明する。図11は、従来の多重情報記録再生装置の概略構成を示すブロック図である。図11に示すように、従来の多重情報記録再生装置は、記録媒体を含んで構成され、その記録媒体に複数の情報からなる多重情報を記憶している情報記憶部111、前記情報記憶部111に記憶されている各情報の管理を行う情報管理部112、前記情報記憶部111に記憶されている各情報の表示再生を行う情報表示部113、及び前記情報表示部113に表示再生されている情報の切り替えを指示する表示情報切替部114を備えている。情報記憶部111は、多重情報として静止画情報や動画情報を含む映像情報及び音声情報を記録している。この多重情報に含まれる各情報は、例えばパケット形式のデータのビットストリームにより構成されている。

【0004】情報管理部112は、情報記憶部111に記憶されている各情報の記録位置及びデータサイズを示す情報を管理している。情報表示部113は、情報管理部112からの指示信号に基づいて、情報記憶部111に記憶されている多重情報を再生して表示する。表示情報切替部114は、ユーザの要求に応じて、情報表示部113に表示再生されている情報を切り替えるよう情報管理部112に指示する。以上の構成により、従来の多重情報記録再生装置は、情報表示部113で表示再生する情報を随時切り替えることにより、ユーザが所望する情報を情報記憶部111内の多重情報から検索して再生し表示していた。

【0005】

【発明が解決しようとする課題】上記のような従来の多重情報記録再生装置では、動画情報が情報記憶部に記憶されていた場合、その情報記憶部内の全ての情報の識別や確認を行うために、それら全ての情報を再生して表示する必要があった。このため、この従来の多重情報記録再生装置では、ユーザが所望する情報を検索して再生し視聴できるまでに長い時間を要するという問題点があ

った。さらに、この従来の多重情報記録再生装置では、情報管理部で管理している管理情報に基づいて、複数の動画情報の先頭フレームの各画像を静止画像として表示再生することは可能であった。しかしながら、先頭フレームの画像だけで動画情報を識別することができない場合があり、この従来の多重情報記録再生装置では複数の動画情報を検索して識別することは容易なものではなかった。

【0006】この発明は、上記のような問題点を解決するためになされたものであり、複数の動画情報を含んだ多重情報が情報記憶部に記憶されている場合でも、その多重情報から所望の情報を容易に検索して再生することができる多重情報記録再生装置、及びそのインデックス情報の作成方法を提供することを目的とする。

【0007】

【課題を解決するための手段】本発明の多重情報記録再生装置は、映像情報及び音声情報を含む複数の情報を記憶した情報記憶部と、前記複数の各情報の記録位置やデータサイズを含む管理情報を管理する情報管理部と、前記管理情報を用いて前記情報記憶部に記憶されている各情報からインデックス情報を作成するインデックス情報作成部と、前記情報記憶部に記憶されている各情報の表示再生を行う情報表示部と、表示されている情報の切り替えを指示する表示情報切替部とを備え、前記情報記憶部が動画情報を記憶している場合、前記インデックス情報作成部は前記動画情報の画像のうち、所定時間分の画像が動画メニュー情報として前記情報表示部で表示再生されるようインデックス情報を作成している。このように構成することにより、複数の動画情報を含んだ多重情報が情報記憶部に記憶されている場合でも、その多重情報から所望の情報を容易に検索して再生することができる。

【0008】本発明のインデックス情報の作成方法は、複数の情報からなる多重情報を記録した多重情報記録再生装置のインデックス情報の作成方法であって、前記多重情報に含まれた動画情報の画像のうち、所定時間分の画像が動画メニュー情報として表示再生されるようにインデックス情報を作成している。このように構成することにより、複数の動画情報を含んだ多重情報が情報記憶部に記憶されている場合でも、その多重情報から所望の情報を容易に検索して再生することができる。

【0009】

【発明の実施の形態】以下、本発明の多重情報記録再生装置、及びそのインデックス情報の作成方法を示す好ましい実施例について、図面を参照しながら説明する。

【0010】《第1の実施例》図1は、本発明の第1の実施例である多重情報記録再生装置の概略構成を示すブロック図である。図1に示すように、本実施例の多重情報記録再生装置は、情報記憶部11、前記情報記憶部11に接続された情報管理部12、情報記憶部11と情報

管理部12に接続されたインデックス情報作成部13、情報記憶部11と情報管理部12に接続された情報表示部14、及び情報管理部12に接続された表示情報切替部15を備えている。情報記憶部11は、CD及びDVDに例示される記録媒体を含んだデータ記録装置により構成され、映像情報及び音声情報を含む複数の情報からなる多重情報を記録している。この多重情報に含まれる各情報は、例えばパケット形式のデータのビットストリームにより構成されている。また、映像情報には、静止画情報や動画像情報が含まれている。情報管理部12は、情報記憶部11に記憶されている多重情報の管理を行うものであり、その多重情報に含まれた各情報の管理情報を管理する。管理情報の具体例には、情報記憶部11での記録位置を示す記録位置情報（アドレス情報）、データサイズ及びデータ数を示す情報がある。これらの管理情報は、情報記憶部11に情報が記録されたとき、情報管理部12により、その記録された情報から抽出または生成され、情報記憶部11の所定の記録位置に記録される。

【0011】インデックス情報作成部13は、情報管理部12で管理されている各情報の管理情報を用いて、情報記憶部11に記憶されている情報から一覧表示を行うためのインデックス情報を作成する。インデックス情報作成部13は、作成したインデックス情報を情報記憶部11に格納する。このインデックス情報は、ユーザが情報記憶部11に記憶されている各情報を検索するさいの検索メニュー情報として用いられるものであり、ユーザの要求に応じて情報表示部14で表示再生される。動画像情報が情報記憶部11に記憶されている場合、インデックス情報作成部13はその動画像情報の画像のうち、所定時間（例えば、数秒）分の画像、好ましくは先頭フレームから所定時間分の画像が動画像メニュー情報として情報表示部14で表示再生されるようインデックス情報を作成する。詳細にいえば、インデックス情報作成部13は、上記所定時間分の画像の記録位置情報及びその所定時間分の画像のデータの少なくとも一方を含んだインデックス情報を作成する。これにより、本実施例の多重情報記録再生装置では、ユーザが情報記憶部11内の情報検索を行うとき、動画像情報の所定時間分の画像が表示再生され、その動画像情報を識別することができる。

【0012】情報表示部14は、ディスプレイやスピーカ等の再生機器を含んだものであり、情報管理部12からの指示信号に基づき情報記憶部11に記憶されている情報の表示再生を行う。表示情報切替部15は、外部から入力されるユーザの要求に応じて、情報表示部14に表示再生されている情報の切り替えを行うよう情報管理部12に指示する。尚、DVD-Video規格に対応した場合、情報記憶部11が記憶している多重情報は、DVD-Video規格のフォーマットで記録されたストリーム情報であり、情報管理部12が管理している管

理情報は、上記規格に規定された制御情報であるナビゲーションパック（以下、“ナビゲーション情報”ともいう）である。

【0013】以下、本実施例の多重情報記録再生装置の動作について説明する。尚、以下の説明では、本実施例の多重情報記録再生装置での機能を明瞭なものとするために、複数の動画像情報が情報記憶部11に記憶されている場合での動画像メニュー情報を含んだインデックス情報を作成する動作について主に説明する。本実施例の多重情報記録再生装置では、まずインデックス情報作成部13が情報記憶部11に記憶されている複数の動画像情報の各管理情報を情報管理部12から取得する。そして、インデックス情報作成部13は、取得した各管理情報を用いて、所定時間分の各画像が情報表示部14で動画像メニュー情報として表示再生されるように、インデックス情報を作成する。続いて、インデックス情報作成部13は、作成したインデックス情報を新たな情報として情報記憶部11に記憶する。その後、検索の要求が外部から表示情報切替部15に入力されると、表示情報切替部15はインデックス情報を表示再生するよう情報管理部12に指示する。これにより、インデックス情報が情報記憶部11から再生され、情報表示部14で表示される。また、一つの情報を再生する要求が外部から表示情報切替部15に入力されると、表示情報切替部15はその要求された情報を表示再生するよう情報管理部12に指示する。これにより、その要求された情報が情報記憶部11から再生され、情報表示部14で表示される。

【0014】以上のように、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、インデックス情報作成部13は情報記憶部11に記憶された動画像情報の画像のうち、所定時間分の画像が動画像メニュー情報として情報表示部14で表示再生されるようインデックス情報を作成している。これにより、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、複数の動画像情報が情報記憶部11に記憶されている場合でも、それらの各動画像情報の所定時間分の画像を表示再生することができる。その結果、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、ユーザはその表示再生されたインデックス情報を視認することにより、情報記憶部11に記憶されている情報を判別し、所望の情報を容易に、かつ効率よく検索して再生することができる。

【0015】ここで図2を参照して、DVD-Video規格に対応した本実施例の多重情報記録再生装置の構成例について、具体的に説明する。図2は、DVD-Video規格に対応して構成した図1に示す多重情報記録再生装置の具体的な構成を示すブロック図である。図2に示すように、この多重情報記録再生装置は、DVD-Video規格のフォーマットでストリーム情報を記憶するDVDイメージ記憶部21、及び前記DVDイメ

ージ記憶部21に記憶されているストリーム情報のナビゲーション情報を管理するDVD制御情報管理部22を備えている。この多重情報記録再生装置には、DVDイメージ記憶部21に記憶されているストリーム情報とDVD制御情報管理部22に管理されているナビゲーション情報を用いて、動画像メニュー情報を作成する動画像メニュー作成部23、DVDイメージ記憶部21に記憶されているストリーム情報の再生を行う映像/音声表示部24、及び表示されている情報の切り替えを行うメニュー切替部25が設けられている。この多重情報記録再生装置では、動画像メニュー作成部23が上述のインデックス情報作成部11(図1)に対応したものであり、映像/音声表示部24で動画像メニュー情報を再生したとき、ストリーム情報に含まれた所定時間分の画像が表示される。

【0016】以上のように、DVD-Video規格に対応した多重情報記録再生装置では、動画像メニュー作成部23がDVDイメージ記憶部21、及びDVD制御情報管理部22にそれぞれ記憶されているストリーム情報、及びナビゲーション情報を用いて、動画像メニュー情報を作成している。これにより、複数のストリーム情報がDVDイメージ記憶部21に記憶されている場合でも、それらの各ストリーム情報の所定時間分の画像を表示再生することができる。その結果、この多重情報記録再生装置、及びそのインデックス情報の作成方法では、ユーザはその表示再生された動画像メニュー情報を視認することにより、DVDイメージ記憶部21に記憶されている情報を判別し、所望の情報を容易に検索して再生することができる。

【0017】さらに、上記多重情報記録再生装置では、DVD-Video規格に規定されたマルチアングル機能を利用して、インデックス情報を作成することもできる。このマルチアングル機能を利用したインデックス情報の具体的な作成方法について、図1と図3を参照して説明する。尚、以下の説明では、動画像情報はそのデータが高効率圧縮符号化技術、例えばMPEG規格に基づき圧縮されているものとする。図3は、図1に示した多重情報記録再生装置でのインデックス情報の作成例を示す説明図である。図3において、3つのMPEG動画像A31、B32、C33は、互いに異なる動画像情報であり、情報記憶部11(図1)に記憶されている。アングルa34、b35、c36は、各々表示情報切替部15により切り替え表示可能な情報表示部14(図1)で表示される表示画面であって、DVD-Video規格に規定されたマルチアングル機能に対応したものである。上述のMPEG動画像A31、B32、C33が情報記憶部11に記憶されている場合、インデックス情報作成部13(図1)は例えばMPEG動画像A31、B32、C33をアングルa34、b35、c36にそれぞれ割り当て、その割り当てたアングルで所定時間分の画像が情報表示部14で表示再生さ

れるように、インデックス情報を作成する。これにより、情報記憶部11内の情報検索を行うとき、ユーザはアングルa34～c36のいずれかのアングルを選択することによって選択したアングルに割り当てられたMPEG動画像を情報表示部14で視認することができる。したがって、ユーザはMPEG動画像A31～C33の識別、及び検索を容易に行うことができる。

【0018】《第2の実施例》図4は、本発明の第2の実施例である多重情報記録再生装置でのインデックス情報作成部の詳細な構成を示すブロック図である。この実施例では、多重情報記録再生装置の構成において、情報記憶部に記憶されている各情報の表示サイズ及びフォーマットを変換して複数の動画像情報に対応したインデックス情報を作成するよう構成した。それ以外の各部分は、第1の実施例のものと同様であるのでそれらの重複した説明は省略する。図4に示すように、本実施例の多重情報記録再生装置では、インデックス情報作成部40は、情報管理部12の管理情報に基づき動画像メニュー情報として必要なデータの判定を行う管理情報判定部41、及び管理情報判定部41で判定されたデータに基づき情報記憶部11に記憶されている各情報の表示サイズやフォーマットを変換する情報変換部42を備えている。さらに、インデックス情報作成部40には、情報変換部42で変換された変換後情報を記憶する変換後情報記憶部43と、管理情報判定部41で判定されたデータに基づいて、情報記憶部11に記憶されている情報に接続するためのメニュー接続情報を作成するメニュー接続情報作成部44とが設けられている。インデックス情報作成部40は、複数の変換後情報をフレーム単位で合成してメニュー接続情報と関連付けた合成情報を作成する情報合成部45、及び情報合成部45で作成された複数フレーム分の合成情報を一つの動画像メニュー情報としてまとめる動画像メニュー情報作成部46を備えている。

【0019】以上のように構成された本実施例の多重情報記録再生装置でのインデックス情報作成部40の動作について説明する。管理情報判定部41は、情報管理部12の管理情報に基づいて、インデックス情報に含まれる動画像メニュー情報として必要なデータの判定を行う。詳細に言えば、管理情報判定部41は上述の管理情報から情報記憶部11に記憶されている全ての情報の数を判別し、動画像メニュー情報としてインデックス情報に含める動画像情報の数を決定する。管理情報判定部41は、決定した動画像情報の各情報の記録位置やデータサイズを示す管理情報を情報管理部12から取得して、上述の必要なデータとして情報変換部42及びメニュー接続情報作成部44に通知する。続いて、情報変換部42は、情報記憶部11に記憶されている各情報毎に、管理情報判定部41で判定されたデータに基づいて、情報表示部14(図1)での表示サイズやフォーマットの変換を行い、変換後情報として変換後情報記憶部43に出力し格

納する。

【0020】次に、メニュー接続情報作成部44は、管理情報判定部41で判定されたデータに基づいて、作成される動画像メニュー情報から情報記憶部11に記憶されている動画像情報への接続情報であるメニュー接続情報を作成する。そして、情報合成部45は、変換後情報記憶部43に記憶されている変換後の各情報をフレーム単位で合成してメニュー情報作成部44で作成されたメニュー接続情報と関連付けた合成情報を作成する。その後、動画像メニュー情報作成部46は、情報合成部45で作成された複数フレーム分の合成情報の一つの動画像メニュー情報としてまとめる。これにより、フレーム単位の合成情報が連続ストリームとしてまとめられる。そして、動画像メニュー情報作成部46は、まとめた動画像メニュー情報を新たな情報として情報記憶部11に記憶する。

【0021】ここで、本実施例のインデックス情報作成部のより具体的な構成例について、図5を参照して説明をする。図5は、図4に示したインデックス情報作成部の具体例の詳細な構成を示すブロック図である。図5に示すように、インデックス情報作成部40aは、情報管理部12の管理情報に基づき動画像メニュー情報として必要なデータの判定を行う管理情報判定部41a、及び前記管理情報判定部41aで判定されたデータに基づき情報記憶部11に記憶されている各情報の表示サイズをフレーム単位に縮小する縮小画像作成部42aを備えている。さらに、インデックス情報作成部40aは、縮小画像作成部42aで縮小された縮小画像を記憶する縮小画像記憶部43a、及び管理情報判定部41aで判定されたデータに基づいて、情報記憶部11に記憶されている情報に接続するためのメニュー接続情報を作成するメニュー接続情報作成部44aを有する。インデックス情報作成部40aには、複数の縮小画像をフレーム単位で合成してメニュー接続情報と関連付けた合成情報を作成する縮小画像合成部45aと、縮小画像合成部45aで作成された複数フレーム分の合成情報の一つの動画像メニュー情報としてまとめる動画像メニュー情報作成部46aとが設けられている。

【0022】以下、上記のように構成されたインデックス情報作成部40aの動作について、図5及び図6を参照して説明する。図6は、図5に示したインデックス情報作成部でのインデックス情報の作成例を示す説明図である。図5及び図6において、情報記憶部11には、8個のMPEG動画像A 51、MPEG動画像B 52、・・・、MPEG動画像H 53を含む情報が記録されている。この場合、縮小画像作成部42aはMPEG動画像A 51の最初の数秒間の画像の記録位置やデータサイズを示す管理情報に基づいて、縮小画像をインデックスa 54として作成する。具体的には、縮小画像作成部42aはMPEG動画像A 51の縮小画像を時刻T0からT1の各フレーム単位毎に作成する。

【0023】同様にして、縮小画像作成部42aはMPEG動画像B 52、・・・、MPEG動画像H 53の各縮小画像を作成する。縮小画像合成部45aは、MPEG動画像A 51、MPEG動画像B 52、・・・、MPEG動画像H 53の最初の各フレームの縮小画像が第1フレーム57の中に一覧表示されるように合成する。縮小画像合成部45aは、同様に第2フレーム58の中に一覧表示されるよう2番目の各フレームの縮小画像を合成し、第nフレーム59（nは整数）の中に一覧表示されるよう時刻T1における各フレームの縮小画像を合成する。その後、動画像メニュー情報作成部46aは、フレーム単位で存在する各合成画像を動画像メニュー情報として連続ストリームに変換する。

【0024】以上のように、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、インデックス情報作成部40aが、情報記憶部11に記憶された複数の各動画像情報において、それらの各動画像情報の画像のうち、所定時間分の動画像情報からなる動画像メニュー情報をインデックス情報に含めて作成している。さらに、インデックス情報作成部40aは、動画像メニュー情報に含める複数の各画像を縮小して一画面（フレーム）内で表示できるよう合成している。これにより、複数の動画像情報が情報記憶部11に記憶されている場合でも、それらの各動画像情報の所定時間分の画像を一画面で表示再生することができる。その結果、ユーザはその表示再生されたインデックス情報を視認することにより、情報記憶部11に記憶されている情報を判別し、所望の情報を容易に検索して再生することができる。さらに、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、上述の画像の縮小及び合成処理は情報管理部12に記憶されている管理情報を基に自動的に行われるので、ユーザの操作や作業を必要とすることなく、検索用のインデックス情報を作成することができる。尚、上述の説明では、8個のMPEG動画像を記憶している場合について説明したが、動画像情報の数は8個に限定されるものではない。

【0025】《第3の実施例》図7は、本発明の第3の実施例である多重情報記録再生装置でのインデックス情報作成部の詳細な構成を示すブロック図である。この実施例では、多重情報記録再生装置の構成において、複数の動画像情報に対応した動画像メニュー情報のデータに圧縮データを用いるよう構成した。それ以外の各部分は、第1の実施例のものと同様であるのでそれらの重複した説明は省略する。図7に示すように、本実施例の多重情報記録再生装置では、インデックス情報作成部60は、情報管理部12の管理情報に基づき動画像メニュー情報として必要なデータの判定を行う管理情報判定部61と、管理情報判定部61で判定されたデータに基づき上記情報記憶部11に記憶されている各情報の表示サイズの変更とデータ圧縮変換を行う情報圧縮部63とを備えてい

る。さらに、インデックス情報作成部60には、情報圧縮部63で圧縮変換された情報を記憶する圧縮情報記憶部64と、その圧縮変換された情報の記録位置情報及びそのデータ圧縮率やデータサイズを示す圧縮情報を管理する圧縮情報管理部62とが設けられている。インデックス情報作成部60は、管理情報判定部61で判定されたデータに基づいて、情報記憶部11に記憶されている情報に接続するためのメニュー接続情報を作成するメニュー接続情報作成部65と、複数の圧縮変換された情報をフレーム単位で合成してメニュー接続情報と関連付けた合成情報を作成する圧縮情報合成部66と、その圧縮情報合成部66で作成された複数フレーム分の合成情報を一つの動画像メニュー情報としてまとめる動画像メニュー情報作成部67とを備えている。

【0026】以上のように構成された本実施例の多重情報記録再生装置でのインデックス情報作成部60の動作について説明する。管理情報判定部61は、情報管理部12の管理情報に基づいて、インデックス情報に含まれる動画像メニュー情報として必要なデータの判定を行う。詳細に言えば、管理情報判定部61は上述の管理情報から情報記憶部11に記憶されている全ての情報の数を判別し、動画像メニュー情報としてインデックス情報に含める動画像情報の数を決定する。管理情報判定部61は、決定した動画像情報の各情報の記録位置やデータサイズを示す管理情報を情報管理部12から取得して、上述の必要なデータとして情報圧縮部63及びメニュー接続情報作成部65に通知する。続いて、情報圧縮部63は、情報記憶部11に記憶されている各情報毎に、管理情報判定部61で判定されたデータに基づき最初の数秒間の画像のデータを各フレーム単位で情報表示部14(図1)での表示サイズの変更とデータ圧縮変換とを行い、圧縮変換された情報として圧縮情報記憶部64に出力し格納する。このデータ圧縮変換でのデータ圧縮率や圧縮画像サイズ(データサイズ)の決定は圧縮情報管理部62の指示に従う。尚、この圧縮情報管理部62でのデータ圧縮率や圧縮画像サイズの管理とは、例えばMPEG圧縮の場合、数マクロブロック単位を画像サイズとし、そのマクロブロックに割り当てられるデータ圧縮率を管理することに対応する。

【0027】次に、メニュー接続情報作成部65は、管理情報判定部61で判定されたデータに基づいて、作成される動画像メニュー情報から情報記憶部11に記憶されている動画像情報への接続情報であるメニュー接続情報を作成する。そして、圧縮情報合成部66は、圧縮情報記憶部64に記憶されている圧縮変換後の各フレーム単位の情報を、圧縮情報管理部62で管理されている記録位置情報及び圧縮情報に基づいて、一画面内に複数の圧縮変換された情報を一覧表示するよう合成して、メニュー接続情報作成部65で作成されたメニュー接続情報と関連付けた合成情報を作成する。その後、動画像メニュー情報作成

部67は、圧縮情報合成部66で作成された複数フレーム分の合成情報を一つの動画像メニュー情報としてまとめる。これにより、フレーム単位の合成情報が連続ストリームとしてまとめられる。そして、動画像メニュー情報作成部67は、まとめた動画像メニュー情報を新たな情報として情報記憶部11に記憶する。

【0028】以上のように、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、インデックス情報作成部60が、情報記憶部11に記憶された動画像情報の画像のうち、所定時間分の動画像情報のデータ(画像)を圧縮して、その圧縮した圧縮画像を含んだインデックス情報を作成している。これにより、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、作成するインデックス情報のデータ量を削減することができる。さらに、インデックス情報作成部60は、動画像メニュー情報に含める複数の各画像を縮小して一画面(フレーム)内で表示できるように合成している。これにより、複数の動画像情報が情報記憶部11に記憶されている場合でも、それらの各動画像情報の所定時間分の画像を一画面で表示再生することができる。その結果、ユーザはその表示再生されたインデックス情報を視認することにより、情報記憶部11に記憶されている情報を判別し、所望の情報を容易に検索して再生することができる。

【0029】《第4の実施例》図8は、本発明の第4の実施例である多重情報記録再生装置でのインデックス情報作成部の詳細な構成を示すブロック図である。この実施例では、多重情報記録再生装置の構成において、情報記憶部内の情報のうち、圧縮されている情報のデータ圧縮率やデータサイズの判定を行う圧縮情報判定部を情報記憶部と情報圧縮部との間に設けた。それ以外の各部分は、第3の実施例のものと同様であるのでそれらの重複した説明は省略する。図8に示すように、本実施例の多重情報記録再生装置では、インデックス情報作成部70は情報記憶部11と情報圧縮部72との間に接続された圧縮情報判定部71を備えている。この圧縮情報判定部71は、情報記憶部11に記憶されている情報のデータ圧縮率やデータサイズを判定して、判定したデータを情報圧縮部72に通知する。情報圧縮部72は、管理情報判定部61、及び圧縮情報判定部71で判定されたデータを用いて、動画像メニュー情報に含める情報のデータ圧縮変換を行う。これにより、本実施例の多重情報記録再生装置では、情報記憶部11に記憶されている情報が既にデータ圧縮された圧縮情報である場合でも、その圧縮情報の一部分をインデックス情報に含めて表示再生することができる。

【0030】以上のように構成された本実施例の多重情報記録再生装置でのインデックス情報作成部70の動作について説明する。尚、以下の説明では、第3の実施例のものと同異なる動作について主に説明する。圧縮情報判

定部71は、管理情報判定部61からの判定されたデータを用いて、情報記憶部11に記憶されている情報の解析を行い、データ圧縮率やデータサイズを含む圧縮情報を判定する。情報圧縮部72は、情報記憶部11に記憶されている各情報毎に、管理情報判定部61、及び圧縮情報判定部71で判定されたデータに基づき最初の数秒間の画像のデータを各フレーム単位で情報表示部14(図1)での表示サイズの変更とデータ圧縮変換とを行い、圧縮変換された情報として圧縮情報記憶部64に出力し格納する。

【0031】以上のように、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、圧縮情報判定部71が情報記憶部11内に保持されている情報のデータ圧縮率やデータサイズを含んだ圧縮情報を判定している。これにより、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、情報記憶部11に記憶されている情報が既にデータ圧縮された圧縮情報である場合でも、その圧縮情報の所定時間分の画像を動画画像メニュー情報に含めて、インデックス情報として表示再生することができる。

【0032】《第5の実施例》図9は、本発明の第5の実施例である多重情報記録再生装置の概略構成を示すブロック図である。図9において、本実施例の多重情報記録再生装置は、情報記憶部81、前記情報記憶部81に接続された情報管理部82、情報記憶部81と情報管理部82に接続されたインデックス情報作成部83、情報記憶部81と情報管理部82に接続された情報表示部84、情報管理部82に接続された表示情報切替部85、情報記憶部81及び情報管理部82に接続された音声管理部86を備えている。情報記憶部81は、CD及びDVDに例示される記録媒体を含んだデータ記録装置により構成され、映像情報及び音声情報を含む複数の情報からなる多重情報を記録している。この多重情報に含まれる各情報は、例えばバケット形式のデータのビットストリームにより構成されている。また、映像情報には、静止画情報や動画画像情報が含まれている。情報管理部82は、情報記憶部81に記憶されている多重情報の管理を行うものであり、その多重情報に含まれた各情報の管理情報を管理する。管理情報の具体例には、情報記憶部81での記録位置を示す記録位置情報、データサイズ及びデータ数を示す情報がある。これらの管理情報は、情報記憶部81に情報が記録されたとき、情報管理部82により、その記録された情報から抽出または生成され、情報記憶部81の所定の記録位置に記録される。

【0033】インデックス情報作成部83は、情報管理部82で管理されている各情報の管理情報を用いて、情報記憶部81に記憶されている情報から一覧表示を行うためのインデックス情報を作成する。インデックス情報作成部83は、作成したインデックス情報を情報記憶部81に格納する。このインデックス情報は、ユーザが情

報記憶部81に記憶されている各情報を検索するさいの検索メニュー情報として用いられるものであり、ユーザの要求に応じて情報表示部84で表示再生される。動画画像情報が情報記憶部81に記憶されている場合、インデックス情報作成部83はその動画画像情報の画像のうち、所定時間(例えば、数秒)分の画像、好ましくは先頭フレームから所定時間分の画像が動画画像メニュー情報として情報表示部84で表示再生されるように、インデックス情報を作成する。この際にインデックス情報作成部83は、取得した管理情報を用いて、所定時間分の画像が対応する音声情報が関連付けを行う。詳細に言えば、インデックス情報作成部83は、上記所定時間分の画像の記録位置情報及びその所定時間分の画像のデータの少なくとも一方を含み、所定時間分の画像に対応した音声情報を関連付けしたインデックス情報を作成する。これにより、本実施例の多重情報記録再生装置では、ユーザが情報記憶部81内の情報検索を行うとき、動画画像情報の所定時間分の画像が音声付きで表示再生され、その動画画像情報を識別することができる。

【0034】情報表示部84は、ディスプレイやスピーカ等の再生機器を含んだものであり、情報管理部82からの指示信号に基づき情報記憶部81に記憶されている情報の表示再生を行う。表示情報切替部85は、外部から入力されるユーザの要求に応じて、情報表示部84に表示再生されている表示情報の切り替えを行うよう情報管理部82に指示する。音声管理部86は、情報表示部84で表示再生されている表示情報に対応した音声情報を選択し再生するよう情報記憶部81に指示する。これにより、本実施例の多重情報記録再生装置は、動画画像メニュー情報が表示再生されたとき、その動画画像メニュー情報に対応した音声情報を選択し再生することができ、音声付きのインデックス情報として再生することができる。

【0035】以下、本実施例の多重情報記録再生装置の動作について説明する。本実施例の多重情報記録再生装置では、まずインデックス情報作成部83が情報記憶部81に記憶されている多重情報の各管理情報を情報管理部82から取得する。そして、インデックス情報作成部83は、取得した各管理情報を用いて、所定時間分の各画像がその対応する音声情報と関連付けて、かつ情報表示部84で動画画像メニュー情報として表示再生されるようインデックス情報を作成する。続いて、インデックス情報作成部83は、作成したインデックス情報を新たな情報として情報記憶部81に記憶する。その後、検索の要求が外部から表示情報切替部85に入力されると、表示情報切替部85はインデックス情報を表示再生するよう情報管理部82に指示する。これにより、インデックス情報が情報記憶部81から再生され、情報表示部84で表示される。さらに、情報表示部84で表示再生されている動画画像メニュー情報と関連付けられた音声情報が音声管理部86によって選択され、再生される。また、一つ

の情報を再生する要求が外部から表示情報切替部85に入力されると、表示情報切替部85はその要求された情報を表示再生するよう情報管理部82に指示する。これにより、その要求された情報が情報記憶部81から再生され、情報表示部84で表示される。

【0036】ここで、図10を参照して、本実施例の多重情報記録再生装置での音声付きのインデックス情報についてより具体的に説明する。図10は、図9に示した多重情報記録再生装置でのインデックス情報の作成例を示す説明図である。図10において、音声付きのインデックス情報101では、8個の動画像情報の所定時間分の各画像(“インデックス”ともいう)を一つにまとめた動画像メニュー情報102と、各インデックスに対応するインデックスa用音声情報103、インデックスb用音声情報104、・・・及びインデックスh用音声情報105とが関連付けられている。そして、情報表示部84がインデックス情報101を表示再生したとき、その表示画面106では8個のインデックスa 107、インデックスb 108、・・・及びインデックスh 109が一覧表示される。その後、ユーザが一つのインデックスを選択したとき、そのインデックスに関連付けられた音声情報が音声管理部86によって選択されて再生される。例えばインデックスa 107が選択されたとき、インデックスa用音声情報103が選択されて再生される。

【0037】以上のように、本実施例の多重情報記録再生装置、及びそのインデックス情報の作成方法では、複数の動画像情報が情報記憶部81に記憶されている場合でも、それらの各動画像情報の所定時間分の画像を、関連付けした音声情報とともに再生することができる。その結果、ユーザはその再生された音声付きのインデックス情報を視聴して確認することにより、情報記憶部81に記憶されている情報を判別し、所望の情報を容易に検索して再生することができる。

【0038】尚、本発明の多重情報記録再生装置、及びそのインデックス情報の作成方法は、上記実施例のいずれかに限られるものではなく、動画像情報が情報記憶部に記憶されているとき、その動画像情報の所定時間分の画像が動画像メニュー情報として表示再生されるようインデックス情報を作成するという、本発明の主旨に基づき種々の変形が可能であり、それらを本発明の範囲から排除するものではない。また、本発明の多重情報記録再生装置、及びそのインデックス情報の作成方法は、光ディスクメディアやテープメディアに例示される。記憶している複数の記憶情報に同時にアクセスできないようなメディアにおいて、記憶情報から所望の情報を検索して再生する記録再生装置、及びそれに用いられるインデックス情報の作成方法として特に有効なものである。

【0039】

【発明の効果】以上のように、本発明の多重情報記録再

生装置、及びそのインデックス情報の作成方法では、インデックス情報作成部は情報記憶部に記憶された動画像情報の画像のうち、所定時間分の画像が動画像メニュー情報として情報表示部で表示再生されるようインデックス情報を作成している。これにより、本発明の多重情報記録再生装置、及びそのインデックス情報の作成方法では、複数の動画像情報が情報記憶部に記憶されている場合でも、それらの各動画像情報の所定時間分の画像を表示再生することができる。その結果、本発明の多重情報記録再生装置、及びそのインデックス情報の作成方法では、ユーザはその表示再生されたインデックス情報を視認することにより、情報記憶部に記憶されている情報を判別し、所望の情報を容易に、かつ効率よく検索して再生することができる。

【図面の簡単な説明】

【図1】本発明の第1の実施例である多重情報記録再生装置の概略構成を示すブロック図

【図2】DVD-Video規格に対応して構成した図1に示す多重情報記録再生装置の具体的な構成を示すブロック図

【図3】図1に示した多重情報記録再生装置でのインデックス情報の作成例を示す説明図

【図4】本発明の第2の実施例である多重情報記録再生装置でのインデックス情報作成部の詳細な構成を示すブロック図

【図5】図4に示したインデックス情報作成部の具体例の詳細な構成を示すブロック図

【図6】図5に示したインデックス情報作成部でのインデックス情報の作成例を示す説明図

【図7】本発明の第3の実施例である多重情報記録再生装置でのインデックス情報作成部の詳細な構成を示すブロック図

【図8】本発明の第4の実施例である多重情報記録再生装置でのインデックス情報作成部の詳細な構成を示すブロック図

【図9】本発明の第5の実施例である多重情報記録再生装置の概略構成を示すブロック図

【図10】図9に示した多重情報記録再生装置でのインデックス情報の作成例を示す説明図

【図11】従来の多重情報記録再生装置の概略構成を示すブロック図

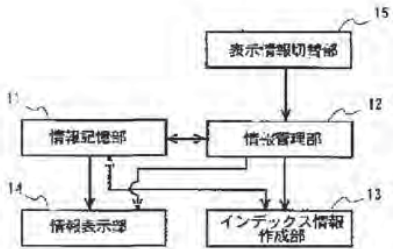
【符号の説明】

- 11, 81 情報記憶部
- 12, 82 情報管理部
- 13, 40, 40a, 60, 70, 83 インデックス情報作成部
- 14, 84 情報表示部
- 15, 85 表示情報切替部
- 41, 41a, 61 管理情報判定部
- 42 情報変換部

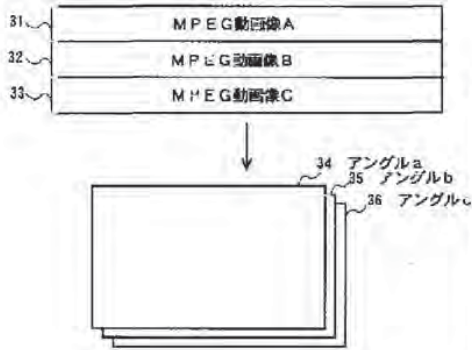
- 42a 縮小画像作成部
- 43 変換後情報記憶部
- 43a 縮小画像記憶部
- 44, 44a, 65 メニュー接続情報作成部
- 45 情報合成部
- 45a 縮小画像合成部
- 46, 46a, 67 動画画像メニュー情報作成部

- 62 圧縮情報管理部
- 63, 72 情報圧縮部
- 64 圧縮情報記憶部
- 66 圧縮情報合成部
- 71 圧縮情報判定部
- 85 音声管理部

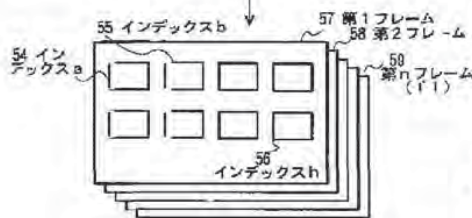
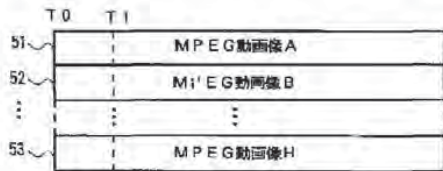
【図1】



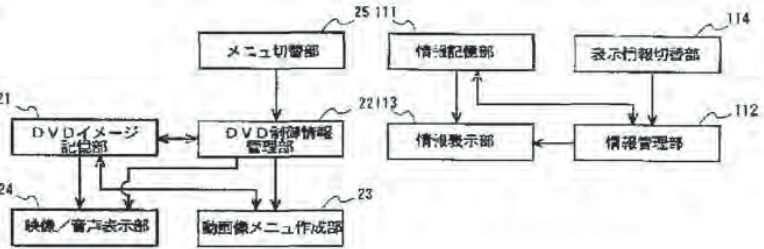
【図3】



【図6】

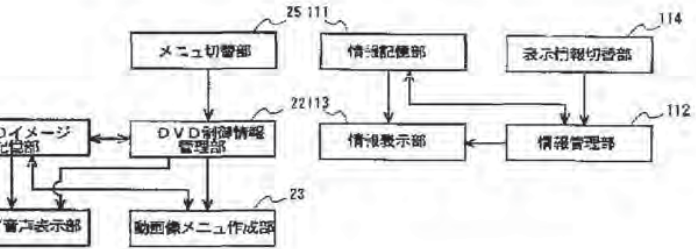


【図2】

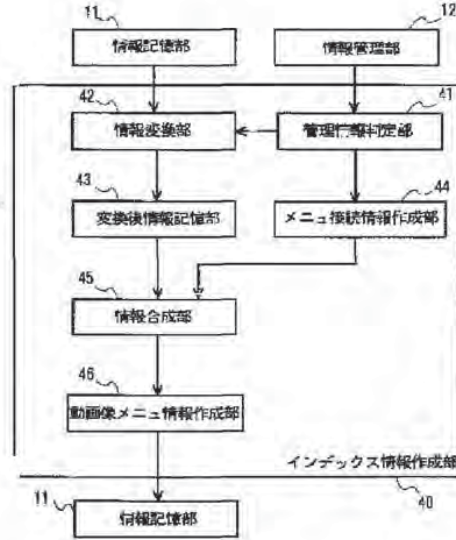


【図4】

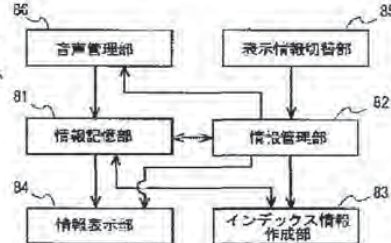
【図11】



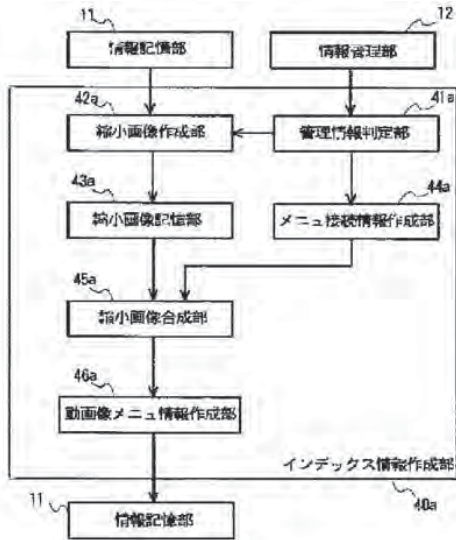
【図9】



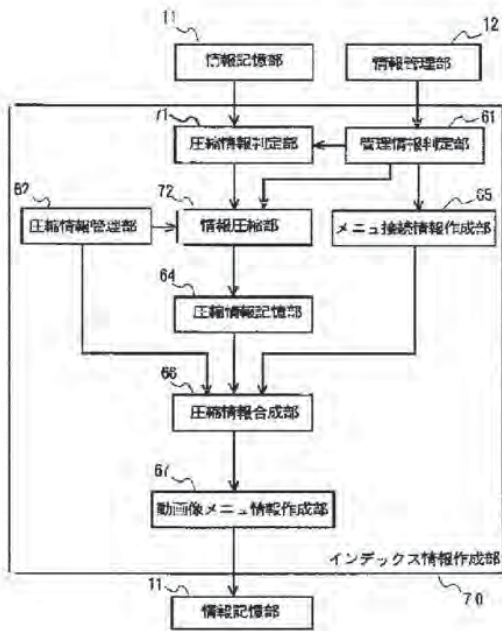
【図9】



【図5】



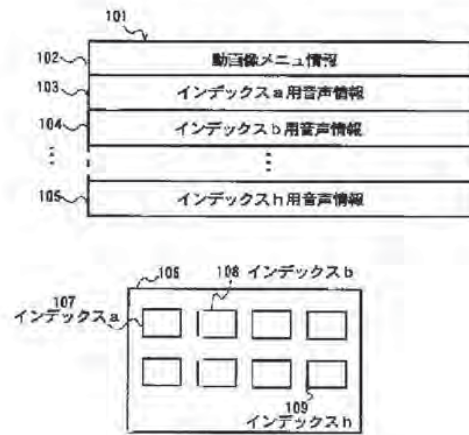
【図8】



【図7】



【図10】



フロントページの続き

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| <p>(54) Title: METHOD AND APPARATUS FOR TIME-SHIFTING VIDEO AND TEXT IN A TEXT-ENHANCED TELEVISION PROGRAM</p> | | |
| <p>(57) Abstract</p> <p>A television system allows a viewer of a text-enhanced television program to pause the program at a particular frame, browse the enhancements at his or her leisure, and then resume viewing the program from that frame, without losing continuity of the video and enhancement portions of the program or program content. This is accomplished by time-shifting the television program for later playback.</p> | | |

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METHOD AND APPARATUS FOR TIME-SHIFTING VIDEO AND TEXT IN A
TEXT-ENHANCED TELEVISION PROGRAM

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CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of provisional patent application serial no.
60/044,161, filed April 21,1997, and provisional patent application serial no. 60/052,248,
10 filed July 11, 1997, the disclosures of which are hereby fully incorporated by reference.

BACKGROUND

The present invention is a system wherein television program-related information
15 (PRI) is embedded in the vertical blanking interval (VBI) of a television signal for display on
a viewer's television screen at the same time as the television program. The PRI is typically
contained in an Internet site, the addresses for which are embedded in the television signal.
The Internet site addresses may also be transmitted synchronously with, but separate from the
20 video portion, e.g., via an interface device such as a telephone or cable modem. Typically
such an "enhanced" television program consists of a display with the video portion of the
program in a picture-in-picture (PIP) window and the PRI in the remaining portion of the
display area of the television screen.

25 This PRI may be any textual or graphic information associated with the current
television program. The PRI may consist of a textual display of a World Wide Web (WWW)
or other Internet site address to which the viewer can choose to link to through a connection
with an Internet Service Provider. Alternatively, the PRI may be contained in one or more
30 Web pages, the addresses of which are inserted into the vertical blanking interval (VBI) and
are automatically retrieved by the user's terminal and displayed on the display screen. Some
examples of PRI are cast members' biographies, trivia about the show, information relating to
35 the particular episode or scene, and closeups of information that cannot be readily seen or is
hidden in the video portion of the program. Some of the PRI may be time dependent on the
program. For example, the PRI may change to correspond to a particular scene or frame of

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the television program.

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With so much information on the screen, some of which may be changing at a fairly rapid pace, it is desirable to provide the viewer the option of pausing a particular frame of a text-enhanced program display and then resume viewing the program without losing continuity of the video and PRI portions of the program or program content.

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According to one embodiment of the invention, a television system is provided which allows a viewer of a PRI-enhanced television program to pause the program at a particular frame, examine the PRI at his or her leisure, perhaps browse through other, linked Web pages, and then resume viewing the program from that frame, without losing continuity of

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the video and PRI portions of the program or program content.

SUMMARY

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According to one embodiment of the invention, an apparatus for time-shifting video and program related information (PRI) in an enhanced television program is provided which includes a display screen, a tuner for receiving a television signal with embedded data representative of an address for an Internet site including PRI, means for extracting the embedded data from the television signal, a memory for storing the embedded data, input

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means for inputting viewer commands, a time-shifting apparatus capable of simultaneously storing the television signal as it is received and outputting the stored television signal for display, means for communicating with an Internet service provider to retrieve information

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from the Internet site including the PRI, and a microcontroller. The microcontroller is configured to retrieve the Internet site address from memory and retrieve the PRI from the Internet site in response to a first viewer command, generate a composite display including a television program contained in the television signal in a first portion of the display and the

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PRI in a second portion of the display in response to the first viewer command, control the time-shifting apparatus to store the television signal as it is received and display a still frame from the stored television signal in a first portion of the display screen in response to a

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second viewer command, and control the time-shifting apparatus to output the portion of the stored television signal subsequent to the still frame for display in the first portion of the display in response to a third viewer command.

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According to another embodiment, a method for time-shifting video and program related information (PRI) in an enhanced television program is provided which includes the steps of receiving a television signal with embedded data representative of an address for an Internet site including PRI, extracting the embedded data from the television signal, storing the embedded data in a memory, selecting an Internet mode in response to a first viewer command, communicating with an Internet service provider to retrieve information from the Internet site including the PRI, displaying a television program contained in the television signal in a first portion of a display screen and the PRI in a second portion of the display screen, storing the television signal in a time-shifting apparatus and continuously displaying a still frame from the stored television signal in response to a second viewer command, and simultaneously displaying the television program subsequent to the still frame from the stored television signal and continuing to store the television signal as it is received in response to a third viewer command.

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According to an alternate embodiment, one or more suspend flags are embedded in the television signal, and the "pause" operation wherein the television signal is stored in the time-shifting apparatus and the still frame displayed in response to detection of such a suspend flag. This feature may be deactivated such that the "pause" operation is only performed in response to a viewer command.

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BRIEF DESCRIPTION OF THE DRAWINGS

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The foregoing features and advantages of the invention will be better understood by referring to the following drawings:

FIG. 1 is a schematic block diagram of a time-shifting apparatus according to one embodiment of the invention:

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FIG. 2 is a display screen in an Internet mode of the time-shifting apparatus;

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FIG. 3 is a display screen accessed by the viewer from the display screen of FIG. 2;

and

FIG. 4 is an alternate layout of the display screens of FIGS. 2 and 3.

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DETAILED DESCRIPTION

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In FIG. 1, the reference numerals refer to the same elements described in application Serial No. 08/475,395 filed on June 6, 1995, the disclosure of which is incorporated fully herein by reference. In addition, the system includes 1) an Internet service provider 33 connected to microprocessor 24 by a transmission link 34 such as a telephone network or a television cable. 2) a VBI decoder 35, 3) a website data memory 36 (memory 36 could be part of the RAM of microprocessor 24 or in terms of the disclosure of the '395 application, memory 22), and 4) a digital Storage Device 52 with associate analog-to-digital and digital-to-analog converters 50, 54. An interface device such as a telephone or cable modem (not shown) couples transmission link 34 to microprocessor 24, if necessary. Internet service provider 33 is connected to an Internet backbone in well known fashion to access data at any site on the WWW.

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Storage device 52 is a television signal time-shifting apparatus. One such time-shifting apparatus is disclosed in U.S. patent application Serial No. 08/388,345 to Russo, et al. filed February 14, 1995, which is fully incorporated herein. Such a time-shifting apparatus includes an optical disc for storage of video programs and separate READ and WRITE heads which operate simultaneously such that real time program information can be stored on the disc while previously stored information on the disc can be read and output to the television signal for display. Other storage media which are capable of rapidly storing extremely large amounts of information may also be used, including magnetic tape, optical disk, magneto-optical disk, or solid state memory (i.e., a high capacity charge coupled device), video RAM, etc.

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The Storage Device 52 holds a large video data buffer (not shown) for storing the television program in digital form. Preferably, the Storage Device is a random access storage medium allowing concurrent reading and writing operations, so that the incoming television signal data may be written to the Storage Device while earlier stored television signal data is being read out for display on TV 20 (that is, time-shifting of the television signal data is performed). The Storage Device 52 has two heads that are separately positionable. When display of the television program is to be suspended, the read head is kept in the same position until a resume command is received. The write head, however, keeps moving to record the incoming television signal data.

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To enable a television viewer to access information about a television program that the viewer is watching, PRI is embedded in the VBI of the television signal carrying the television program. For example, the PRI may be textual information regarding actors and actresses in the show, advertisements of program-related merchandise, brief descriptions of the plot of future episodes of the television program, or any other text regarding the television program, or the PRI may be text representing web pages containing such information.

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According to a preferred embodiment, the PRI is contained on a web page, the address for which is embedded in the VBI of the television signal. When the television signal carrying the program being watched is captured by tuner 11, the website data embedded in its VBI is stripped out by VBI decoder 35 and sent to microprocessor 24 for storage in website data memory 36. The memory addresses of the website names are linked to the website addresses in memory 36. An icon appears on the screen of television 20 when the television program is displayed full screen, i.e., in the TV mode, to inform the viewer that website data accompanies the television signal and is stored in memory 22. If the viewer wishes to access a website in connection with the television program, the viewer presses a button on a viewer input device 28 such as a remote controller, which introduces the Internet mode of operation shown in FIG. 2 and described below. Microprocessor 24 is programmed to carry out this operation. By repeatedly pressing a button on the viewer input device, the viewer can toggle

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back and forth between the TV mode and the Internet mode. Although viewer inputs are discussed herein as initiated by buttons on a remote controller, other input devices can also be used. For example, a cursor could be displayed on the television screen which is movable around the screen and a selection can be made (i.e., "clicked") when the cursor is in a desired location of the screen.

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In the Internet mode, the video portion of the television program last viewed in the TV mode is displayed in area 42. As an option, a textual description of the program is displayed in an area 44 and information about the television program, i.e., program title, station name, and channel number are displayed in a banner 49 underneath areas 42 and 44. A message is displayed at the top of an area 46 to prompt the viewer to select from a number of website names displayed in area 46 by moving a cursor 48 with arrow keys on the viewer input device. For example, if the television program is a serial television show, for example, "Married With Children," the website names could be information related to the show. After a website name is selected, the viewer presses a button on the viewer input device. As a result, the website address to which the selected website name is linked is retrieved from memory 36 by microprocessor 24 and sent through the telephone or cable interface to Internet service provider 33. (If desired, this function of microprocessor 24 could be carried out by commercial equipment sold under the trademark WEB TV.) The information at the addressed website is downloaded from Internet service provider 33 over link 34 to microprocessor 24 and then displayed on the screen simultaneously with the television program to which the information relates, as illustrated in FIG. 3, after being composed by video processor 30. As illustrated in FIG. 3, the name of the website can be displayed above the text of the information from the website. If the television program is a serial television show, as previously stated, the displayed information could include information about the episode, cast biographies, and trivia related to the show. The viewer then navigates about the website in the manner dictated by the viewer's software to find the desired information.

An alternative layout of the television screen for the present invention is shown in

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FIG. 4. In this layout, the television program is displayed in a majority portion 60 of the screen while the PRI is displayed along two border regions 62. The Web page including the PRI can be specifically configured to display the PRI in the border regions and an area designated for the real time image in the PIP. The PIP circuitry 19 is specially configured to a smaller reduction ratio, for example 1.5:1 rather than 3:1 for a standard PIP, in order to produce the larger PIP display.

The screen portion 60 displays a television program consisting of moving images.

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Referring back to FIG. 1, when the viewer interacts with the website data or other PRI displayed on the television screen, the viewer's attention is diverted from the television program being shown to the website data. The viewer is then missing what is happening in the television program until the viewer's interaction with the PRI is concluded. To overcome this situation, an additional component, Storage Device 52, described above, is added to the system to "time-shift" the display of the television program. As the television signal is being received by Tuner 11, the signal is forwarded through IF Amp 12 and Picture DET 13 to VCR 17. The VCR sends the signal through an analog to digital converter (A/D) 50 to Storage Device 52. The Storage Device is under the control of the Microprocessor 24 and is capable of storing the incoming television signal in real-time as digital information for future use.

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As the television signal is being stored, if a viewer wants to interact with the PRI such as website data or other textual information being displayed on the television screen, the viewer sends a command to the microprocessor 24 via the viewer input device 28. The viewer action to send the command could, for example, consist of pushing a button on the viewer input device. In response, the microprocessor 24 controls VCR 17 to output the television signal to the Storage Device 52 which begins storing the television signal, including the PRI information embedded in the VBI. The Storage Device 52 simultaneously outputs the first stored frame of the video signal to the signal processing unit for extended display on television 32. The television 32 continues to display this frame until controlled by

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the viewer to continue without effect on any viewer activity with the PRI shown in the remainder of the display screen. The viewer then interacts with the PRI as described above.

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When the viewer is done interacting with the PRI, the viewer sends a command to the microprocessor 24 to resume display of the television program. However, instead of displaying the incoming television signal from Tuner 11, the VCR directs the delivery of the stored television signal data output from the READ head of Storage Device 52 through Digital-to-Analog Converter (D/A) 54 and SW 18 to PIP 19 for display on TV 20. The data displayed is that part of the television program immediately subsequent to the point of suspension. That is, it has been time-shifted. The incoming television signal data continues to be stored by the WRITE head of the Storage Device 52 in a time-ordered manner regardless of the functioning of the READ head. In other words, when display of the television program is to be suspended, the READ head is kept in the same position until a resume command is received. The WRITE head, however, keeps moving to record the incoming television signal data. Hence, at this time the data being stored is not the same data that is being displayed; there is a time lag between the two sets of data. In this manner, the viewer may continue watching the program without losing continuity of the program or PRI content. The viewer can position a cursor and enter input to freeze the display of the television program image on command.

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In another embodiment, the PRI is contained on several web pages, each corresponding to a particular portion of the program and transmitted chronologically throughout the duration of the program. The television signal including the embedded website addresses is stored on the Storage Device 52 and hence the corresponding Web pages remain linked to the appropriate portion of the television program as the signal is read out from the Storage Device 52 after a "pause" operation. In this manner, the viewer may continue watching the program without losing continuity of the program or PRI content.

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The audio portion of the television signal is also stored in the Storage Device along with the video portion. When the live television program is put into a "freeze" frame state,

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the audio portion of the television program is also suspended and not transmitted to the viewer. Instead, the audio portion is stored. When display of the suspended television program is resumed, the audio data is obtained from the Storage Device along with the video portion and forwarded by VCR 17 through Sound Amp 15 and loudspeaker 16 to the viewer.

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In another embodiment, the television signal is already in digital form, such as for high-definition digital television (HDTV). Therefore, an analog to digital conversion is unnecessary. The Storage Device continuously stores the television signal in a wraparound fashion whenever the system is operational, overwriting the oldest previously stored television signal data when the Storage Device becomes full. The Storage Device should be large enough to hold two to three hours of television programming before overwriting earlier broadcast television signal data.

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The present invention allows a viewer to interrupt his or her viewing of a television program to interact with PRI carried in the VBI of the television signal and displayed on the television screen, and yet rejoin the television program at a later point in time without missing any of the program.

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In another embodiment, the display of the incoming television signal may be suspended automatically by inserting a suspend flag into the VBI, rather than by an explicit action by the viewer. When the suspend flag is detected by the microprocessor 24 after decoding by VBI decoder 35, the microprocessor instructs the VCR via a control link (not shown) to suspend the current display of the television signal. Resumption of display of the television program is commenced by viewer input. The viewer could also override the automatic suspension feature provided by the suspend flag by setting a predetermined control value to override all automatic suspend flags, or by entering viewer input when the suspension activity occurs in order to rapidly rejoin the television program in progress.

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Alternatively, a resume flag is inserted into the VBI at a predetermined time after the suspend flag. When the resume flag is received, the microprocessor automatically controls the VCR to resume display of the television program.

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According to yet another embodiment, the viewer may access the information as any other storage media, such as a video tape, and pause, rewind, or fast forward to different portions of the program stored on the disc after the initially "pause" command. It may be desirable to continuously record the program on the time-shifting apparatus 46 regardless of a viewer "pause" command to allow for these functions over a period of time, limited only by the storage capacity of the time-shifting device.

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Although the present invention has been described with respect to particular embodiments, those skilled in the art will appreciate that the present invention may be modified without departing from the scope of the invention. Accordingly, all such modifications are intended to be included within the scope of the invention as defined by the following claims.

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CLAIMS:

- 5 1. Apparatus for time-shifting video and program related information (PRI) in an enhanced television program comprising:
- a display screen;
 - a tuner for receiving a television signal with embedded data representative of an
 - 10 address for an Internet site including PRI;
 - means for extracting the embedded data from the television signal;
 - a memory for storing the embedded data;
 - input means for inputting viewer commands;
 - 15 a time-shifting apparatus capable of simultaneously storing the television signal as it is received and outputting the stored television signal for display;
 - means for communicating with an internet service provider to retrieve information from the internet site including the PRI; and
 - 20 a microcontroller comprising
 - means for retrieving the internet site address from memory and retrieving the PRI from the internet site in response to a first viewer command;
 - 25 means for generating a composite display including a television program contained in the television signal in a first portion of the display and the PRI in a second portion of the display in response to the first viewer command,
 - means for controlling the time-shifting apparatus to store the television signal as it is received and display a still frame from the stored television signal in a first
 - 30 portion of the display screen in response to a second viewer command, and
 - means for controlling the time-shifting apparatus to output the portion of the stored television signal subsequent to the still frame for display in the first portion of
 - 35 the display in response to a third viewer command.

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2. The apparatus of claim 1 wherein the time-shifting apparatus is an optical disc.

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3. The apparatus of claim 1 wherein the time-shifting apparatus is a solid state memory.

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4. The apparatus of claim 1 wherein the PRI comprises text and graphics related to the television program.

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5. The apparatus of claim 4 wherein the PRI comprises a plurality of website addresses.

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6. The apparatus of claim 5 wherein the microcontroller comprises means for retrieving information from one of said plurality of website addresses in response to a fourth viewer command.

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7. The apparatus of claim 1 wherein the first portion of the display covers a minor portion of the display screen and the second portion of the display covers a major portion of the display screen.

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8. The apparatus of claim 1 wherein the first portion of the display covers a major portion of the display screen and the second portion of the display covers a minor portion of the display screen.

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9. The apparatus of claim 1 wherein the means for communicating with the internet service provider is a modem.

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10. A method for time-shifting video and program related information (PRI) in an enhanced television program comprising the steps of:

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receiving a television signal with embedded data representative of an address for an internet site including PRI;

extracting the embedded data from the television signal;

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storing the embedded data in a memory;

selecting an internet mode in response to a first viewer command;

communicating with an internet service provider to retrieve information from the internet site including the PRI;

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displaying a television program contained in the television signal in a first portion of a display screen and the PRI in a second portion of the display screen;

storing the television signal in a time-shifting apparatus and continuously displaying a still frame from the stored television signal in response to a second viewer command; and

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simultaneously displaying the television program subsequent to the still frame from the stored television signal and continuing to store the television signal as it is received in response to a third viewer command.

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11. The method of claim 10 wherein the PRI comprises a plurality of website addresses and further comprising the steps of:

selecting one of the plurality of website addresses in the PRI;

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retrieving information from the selected website address; and

displaying the information from the selected website address.

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12. A method for time-shifting video and program related information (PRI) in an enhanced television program comprising the steps of:

receiving a television signal with embedded data representative of an address for an internet site including PRI and a suspend flag;

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extracting the embedded data from the television signal;

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storing the embedded data in a memory;

selecting an internet mode in response to a first viewer command;

communicating with an internet service provider to retrieve information from the internet site including the PRI;

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displaying a television program contained in the television signal in a first portion of a display screen and the PRI in a second portion of the display screen;

detecting the suspend flag;

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storing the television signal in a time-shifting apparatus and continuously displaying a still frame from the stored television signal; and

simultaneously displaying the television program subsequent to the still frame from the stored television signal and continuing to store the television signal as it is received in response to a second viewer command.

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13. The method of claim 12 wherein the step of storing television signal in the time-shifting apparatus is performed in response to detecting the suspend flag.

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14. The method of claim 12 wherein the step of storing the television signal in the time-shifting apparatus is performed in response to a third viewer command.

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FIG. 1

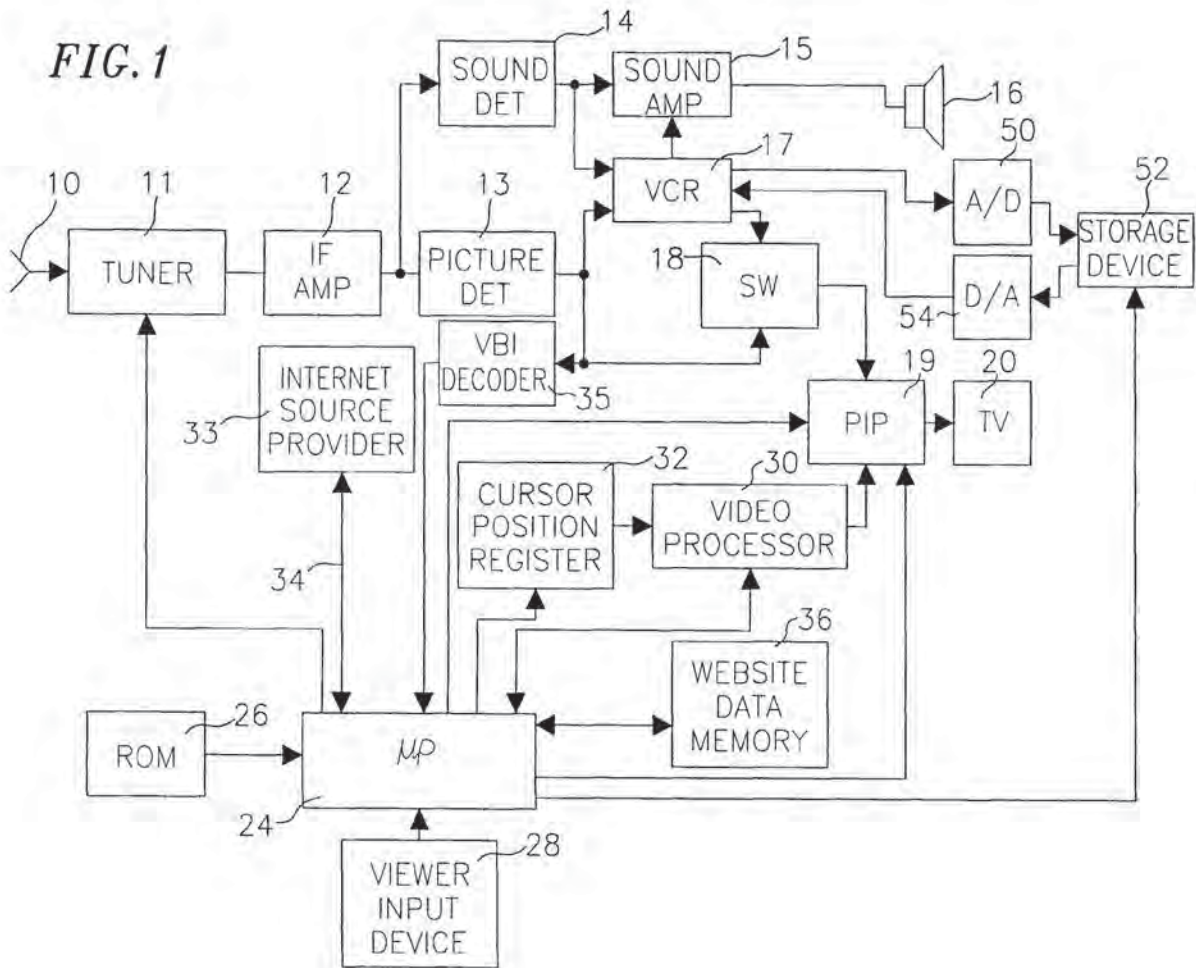
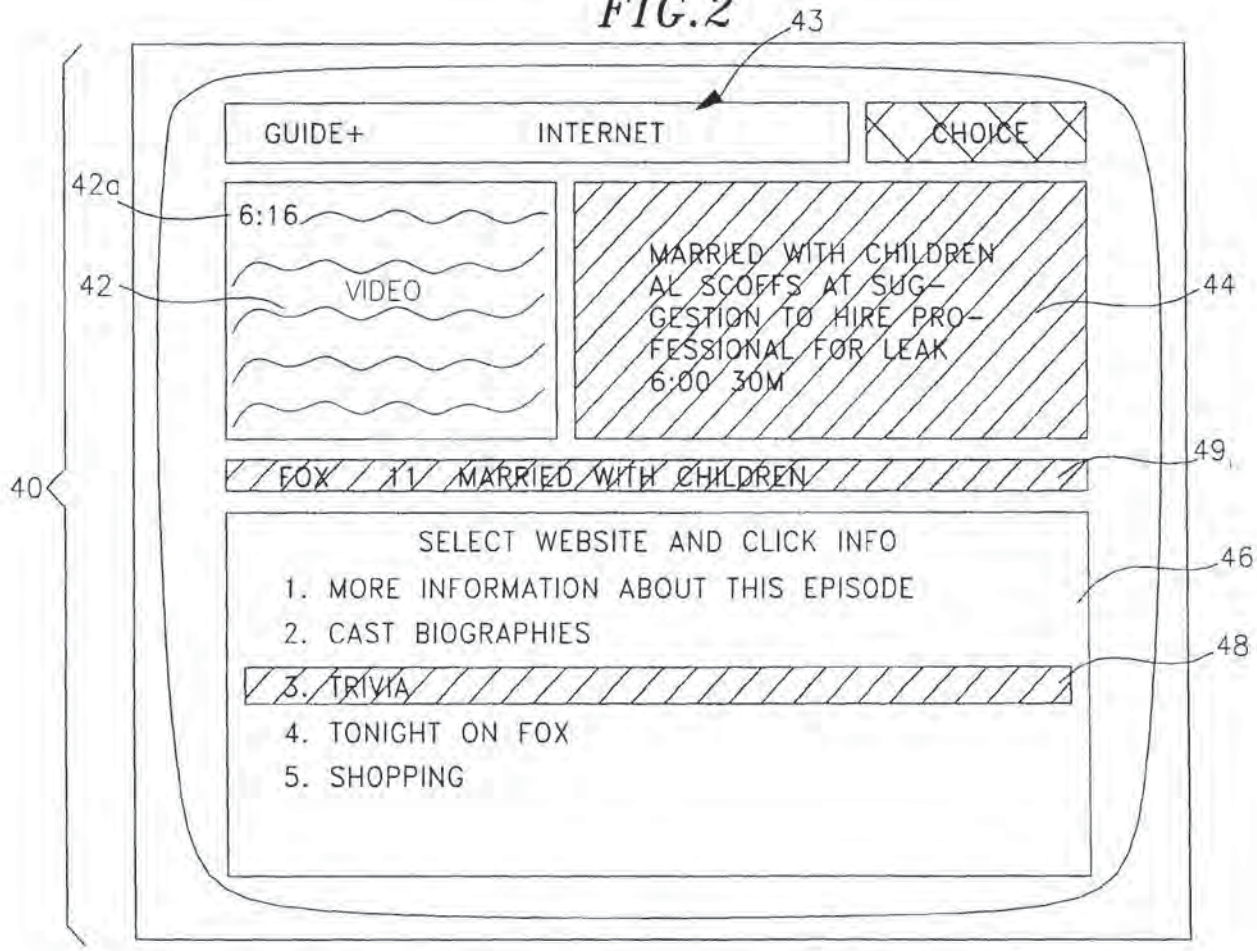


FIG. 2



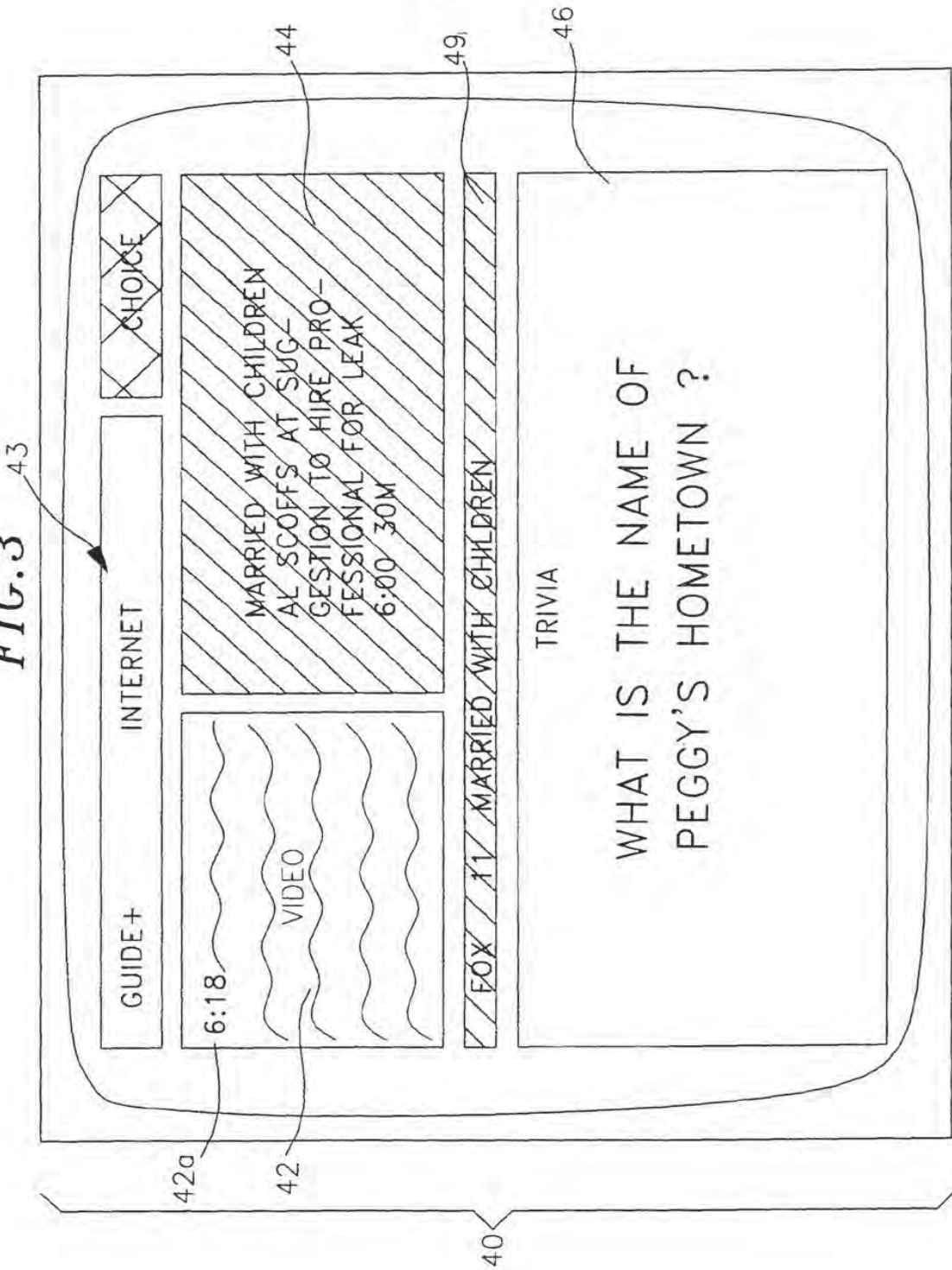
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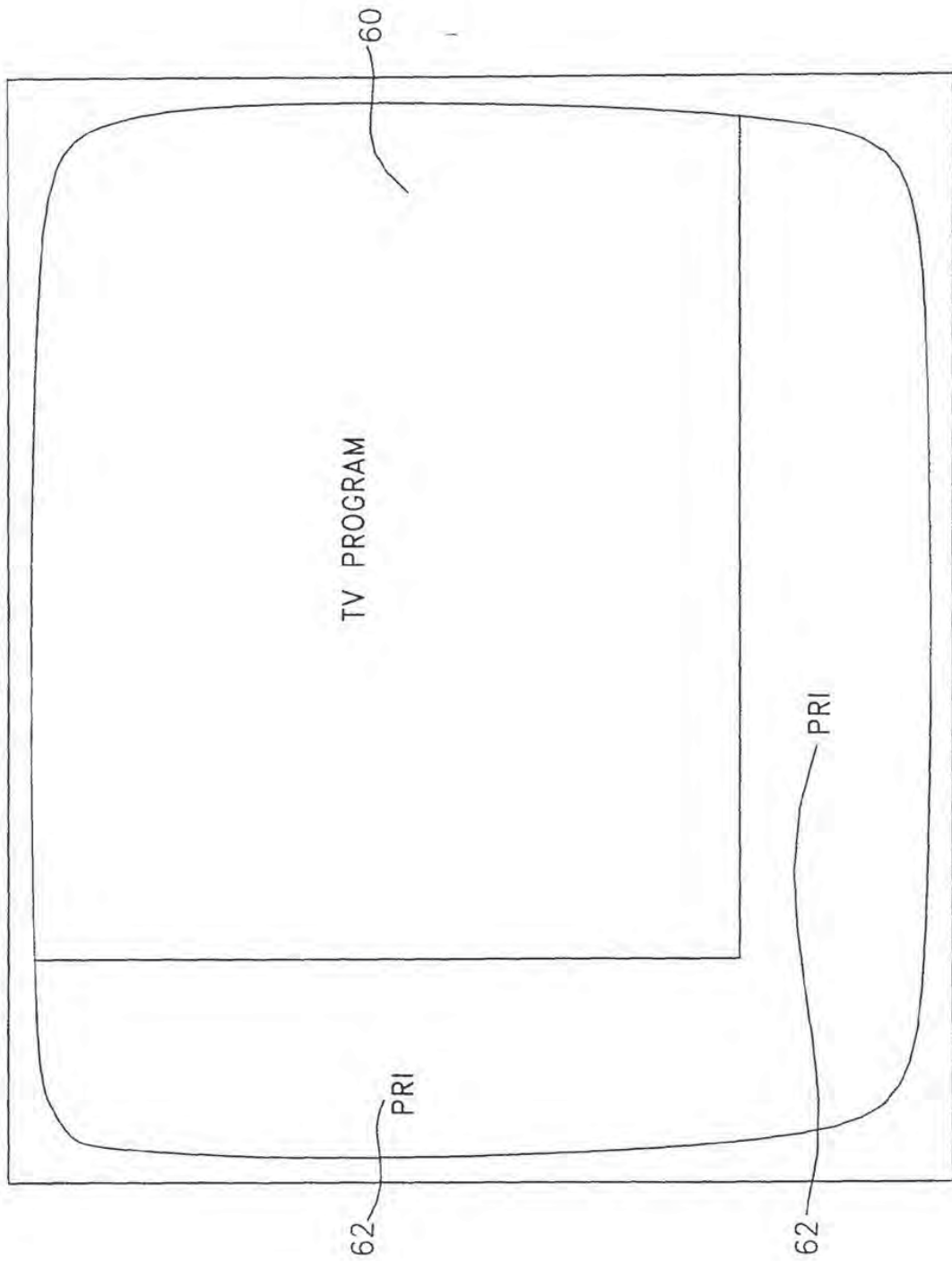
FIG. 3



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FIG. 4



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Electronic Acknowledgement Receipt

| | |
|---|--------------------------------|
| EFS ID: | 5786427 |
| Application Number: | 90009329 |
| International Application Number: | |
| Confirmation Number: | 2859 |
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| First Named Inventor/Applicant Name: | 6233389 |
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July 28, 2009

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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: 2513.002REX0

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1. Information Disclosure Statement (IDS);
2. Two (2) sheets of IDS Form PTO/SB/08A listing forty-one (41) documents (US1-US22 and FP1-FP19);
3. Two (2) sheets of IDS Form PTO/SB/08B listing nineteen (19) documents (NPL24-NPL42);
4. Information Disclosure Statement for Material Cited in Related Applications;
5. Three (3) sheets of IDS Form PTO/SB/08B listing twenty-three (23) documents (NPL1-NPL23);
6. Information Disclosure Statement for Material Related to District Court Litigations;
7. One (1) sheet of IDS Form PTO/SB/08B listing six (6) documents (NPL43-NPL48); and

Commissioner for Patents
July 28, 2009
Page 2

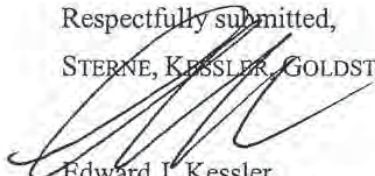
8. Certification of Service of Information Disclosure Statement, Information Disclosure Statement for Material Cited in Related Applications, and Information Disclosure Statement for Material Related to District Court Litigations.

The above-listed documents are 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.



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

EJK/LAG:mlb
Enclosures
1010836_1.DOC

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reexam: 6,233,389

BARTON, *et al*

Control No. 90/009,329

Filed: November 10, 2008

For: **Multimedia Time Warping System**

Confirmation No.: 2859

Art Unit: 3992

Examiner: FERRIS, Fred

Atty. Docket: 2513.002REX0

Information Disclosure Statement for Material Cited in Related Applications

Mail Stop Ex Parte Reexam

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

Sir:

The Patent Owner, TiVo, is the assignee of a group of applications which claim priority to the above captioned U.S. Patent No. 6,233,389 (referred herein as "the '389 patent family"). A diagram showing the members of the '389 patent family and their priority relationship is attached as Exhibit A. Patent Owner respectfully requests that the Examiner review the file history of each of the applications, identified in Exhibit A, before issuing an action in the present reexamination.

Listed on accompanying IDS Form are documents that may be considered material to the patentability of this reexamination in view of MPEP 2001.06(b). Specifically, the Patent Owner has listed and provided copies of office actions issued during prosecution of U.S. Application Nos. 09/827,029, 09/035,426, 10/081,776, 10/418,646, 11/051,347, 11/725,909, and 11/726,054.

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.

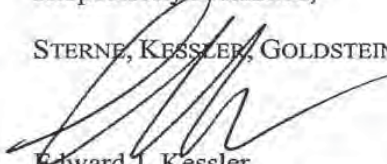
Patent Owner reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered. This IDS 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.

A copy of documents NPL1-NPL23 is submitted. 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: *28 July 2008*

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

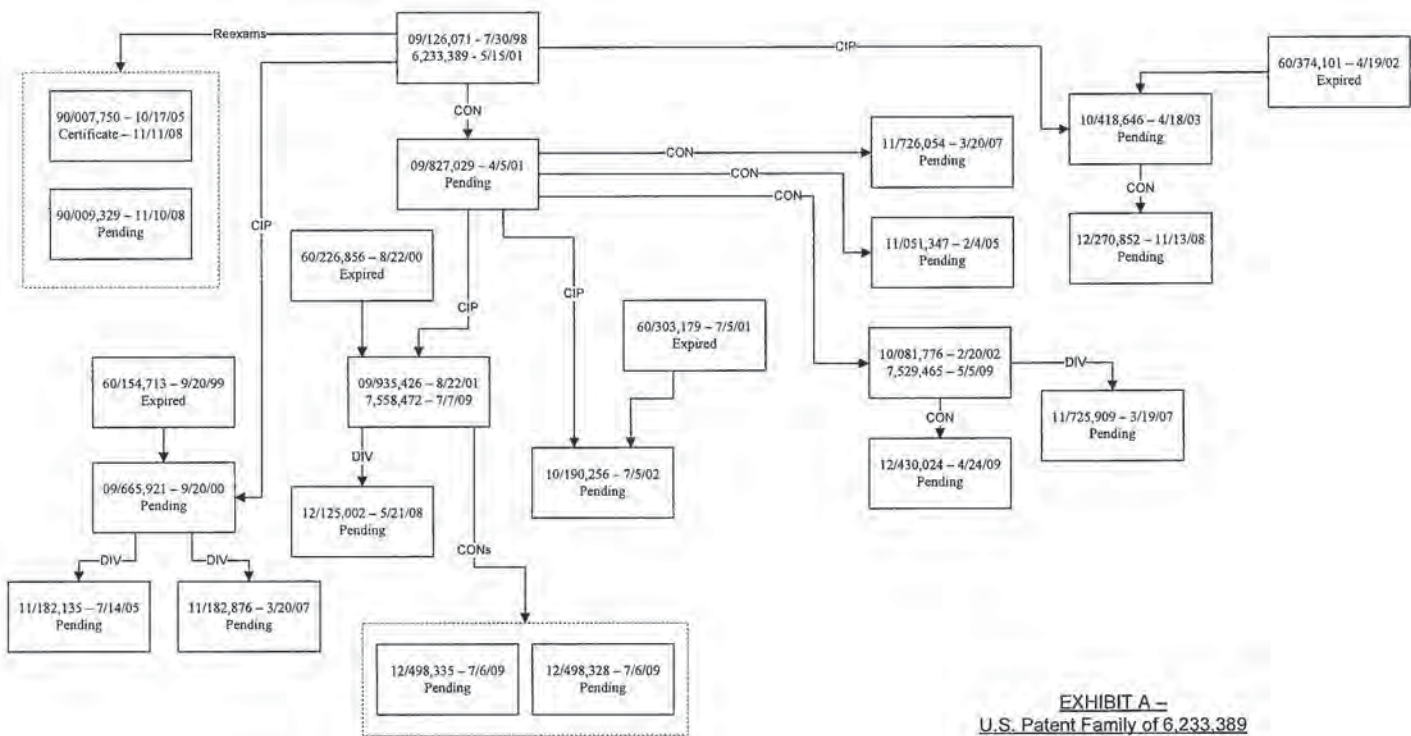


EXHIBIT A -
U.S. Patent Family of 6,233,389

| | | | | | |
|---|---|----|---|-------------------------------|---------------------|
| Substitute for form 1449/PTO | | | | Complete if Known | |
| INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i> | | | | <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. |
| Sheet | 1 | of | 3 | <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 |
|--------------------|-----------------------|--|----------------|
| | NPL1 | Office Communication, dated June 10, 2003, for U.S. Patent Appl. No. 09/827,029, filed April 5, 2001, 42 pages. | |
| | NPL2 | Office Communication, dated November 17, 2003, for U.S. Patent Appl. No. 09/827,029, filed April 5, 2001, 12 pages. | |
| | NPL3 | Office Communication, dated February 9, 2006, for U.S. Patent Appl. No. 09/827,029, filed April 5, 2001, 26 pages. | |
| | NPL4 | Office Communication, dated June 19, 2007, for U.S. Patent Appl. No. 09/827,029, filed April 5, 2001, 20 pages. | |
| | NPL5 | Office Communication, dated January 11, 2008, for U.S. Patent Appl. No. 09/827,029, filed April 5, 2001, 21 pages. | |
| | NPL6 | Office Communication, dated February 2, 2009, for U.S. Patent Appl. No. 09/827,029, filed April 5, 2001, 19 pages. | |
| | NPL7 | Office Communication, dated January 28, 2008, for U.S. Patent Appl. No. 09/935,426, filed August 22, 2001, 9 pages. | |
| | NPL8 | Office Communication, dated September 2, 2008, for U.S. Patent Appl. No. 09/935,426, filed August 22, 2001, 8 pages. | |
| | NPL9 | Office Communication, dated October 23, 2002, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 16 pages. | |
| | NPL10 | Office Communication, dated April 4, 2003, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 18 pages. | |

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

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.
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| Substitute for form 1449/PTO | | | | Complete if Known | |
| | | | | <i>Application Number</i> | 90/009,329 |
| INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i> | | | | <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 | 2 | of | 3 | | |

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 number, publisher, city and/or country where published | T ² |
|--------------------|-----------------------|---|----------------|
| | NPL11 | Office Communication, dated September 29, 2003, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 15 pages. | |
| | NPL12 | Office Communication, dated June 29, 2004, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 19 pages. | |
| | NPL13 | Office Communication, dated May 20, 2005, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 15 pages. | |
| | NPL14 | Office Communication, dated February 8, 2006, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 18 pages. | |
| | NPL15 | Office Communication, dated November 3, 2006, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 8 pages. | |
| | NPL16 | Office Communication, dated June 5, 2007, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 5 pages. | |
| | NPL17 | Office Communication, dated October 19, 2007, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 7 pages. | |
| | NPL18 | Office Communication, dated July 30, 2008, for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 4 pages. | |
| | NPL19 | Office Communication, dated April 29, 2008, for U.S. Patent Appl. No. 10/418,646, filed April 18, 2003, 10 pages. | |
| | NPL20 | Office Communication, dated November 12, 2008, for U.S. Patent Appl. No. 10/418,646, filed April 18, 2003, 14 pages. | |

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

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 | |
| | | | | <i>Application Number</i> | 90/009,329 |
| INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i> | | | | <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 | 3 | of | 3 | | |

| 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 number, publisher, city and/or country where published | T ² |
| | NPL21 | Office Communication, dated June 9, 2009, for U.S. Patent Appl. No. 10/418,646, filed April 18, 2003, 17 pages. | |
| | NPL22 | Office Communication, dated May 12, 2008, for U.S. Patent Appl. No. 11/051,347, filed February 4, 2005, 16 pages. | |
| | NPL23 | Office Communication, dated December 23, 2008, for U.S. Patent Appl. No. 11/051,347, filed February 4, 2005, 21 pages. | |
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| Examiner Signature | | Date Considered | |
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reexam: 6,233,389

BARTON, *et al*

Control No. 90/009,329

Filed: November 10, 2008

For: **Multimedia Time Warping System**

Confirmation No.: 2859

Art Unit: 3992

Examiner: FERRIS, Fred

Atty. Docket: 2513.002REX0

**Information Disclosure Statement for Material Related to District Court
Litigations**

Mail Stop Ex Parte Reexam

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

Sir:

TiVo Inc. is the owner of the above captioned U.S. Patent No. 6,233,389 ("the '389 patent"). The '389 patent is involved in two civil actions pending in the Eastern District of Texas styled *TiVo Inc. v. Echostar Communications Corp.*, 2:04-CV-1-DF and *Dish Network Corp. v. TiVo Inc.*, 1:08-CV-00327-JJF.¹ Neither of these actions has been stayed pending the outcome of the above captioned reexamination.

Listed on accompanying IDS Form are documents from those actions that may be considered material to the patentability of this reexamination. Copies of documents NPL43-NPL48 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.

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

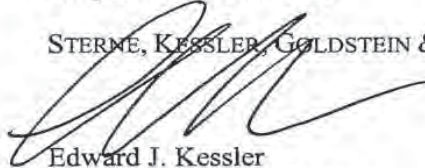
information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered. This IDS submission should not be construed as a representation that a search has been made, or that information more material to the examination of the present reexamination 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: 28 July 2009

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

¹ *Dish Network Corp. v. TiVo Inc.* action was originally filed in the United States District Court for the District of Delaware. The Delaware District Court transferred the action to the Eastern District of Texas on May 28, 2009.

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|---|---|----|---|-------------------------------|---------------------|
| Substitute for form 1449/PTO | | | | Complete if Known | |
| | | | | <i>Application Number</i> | 90/009,329 |
| INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i> | | | | <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 | 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 |
| | NPL43 | U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, TiVo Inc. v. Echostar Communications Corp. et al., Decision, Case No. 2006-1574, January 31, 2008. | |
| | NPL44 | U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Amended Final Judgment and Permanent Injunction, TiVo Inc. v. Echostar Communications Corp. et al., Case No. 2:04-CV-1-DF, June 2, 2009. | |
| | NPL45 | U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Complaint for Declaratory Relief, Dish Network Corp. v. Echostar Communications Corp., Case No. 1:08-CV-00327-JJF. | |
| | NPL46 | U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Memorandum Opinion, Tivo Inc. v. Echostar Communications Corp. et al., Case No. 2:04-CV-1-DF, June 2, 2009. | |
| | NPL47 | U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, TiVo Inc. v. Echostar Communications Corp. et al., Order granting stay, pending appeal, of order of U.S. District Court for the Eastern District of Texas (1) holding EchoStar in contempt of its previous injunction, (2) enjoining EchoStar, and (3) requiring that EchoStar take certain steps in light of its contempt holdings, July 1, 2009. | |
| | NPL48 | U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Order denying EchoStar's Motion to Suspend Proceedings on TiVo's Motion for Sanctions, July 14, 2009. | |
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| Examiner Signature | Date Considered |
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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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Electronic Acknowledgement Receipt

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|---|--------------------------------|
| EFS ID: | 5786593 |
| 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/Jason Geider |
| Filer Authorized By: | Lori Ann Gordon |
| Attorney Docket Number: | 2513.002REX0 |
| Receipt Date: | 28-JUL-2009 |
| Filing Date: | 10-NOV-2008 |
| Time Stamp: | 19:58:41 |
| Application Type: | Reexam (Patent Owner) |

Payment information:

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File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|---|------------|---|------------------|------------------|
| 1 | Information Disclosure Statement (IDS) Filed (SB/08) | IDS_OA.pdf | 266639 <small>386c01bb7cee872b61da4925adff8de839b80af3</small> | no | 7 |

Warnings:

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| 2 | NPL Documents | NPL01_09827029_2003_06_10 _rejection.pdf | 1574475 <small>cc0267912dbf7ca864f7e378fe05628cdbc12473</small> | no | 42 |
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| Warnings: | | | | | |
| Information: | | | | | |
| 4 | NPL Documents | NPL03_09827029_2006_02_09 _rejection.pdf | 961668 <small>01040bd36ebbbebb358d336275a4c72e3250f4078</small> | no | 26 |
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| 5 | NPL Documents | NPL04_09827029_2007_06_19 _rejection.pdf | 762996 <small>0859a64b4541172076a910cedc47466a47813c83</small> | no | 20 |
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| 10 | NPL Documents | NPL09_10081776_2002_10_23 _rejection.pdf | 544294 <small>0f0a8b28c90f1309566453d32eac39b11a2d51</small> | no | 16 |

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| 12 | NPL Documents | NPL11_10081776_2003_09_29_rejection.pdf | 535223 83e59581797f56cf135a34882f946d24009969 | no | 15 |
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| | | | | Filing Date | November 10, 2008 |
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| | | | | Art Unit | 3992 |
| | | | | Examiner Name | Ferris III, Fred O. |
| Sheet | 1 | of | 2 | Attorney Docket Number | 2513.002REX0 |

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| | | First Named Inventor | James M. BARTON |
| | | Art Unit | 3992 |
| | | Examiner Name | Ferris III, Fred O. |
| Sheet | 2 | of | 2 |
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| | | | | <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 |
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| | NPL9 | Office Communication, dated October 23, 2002, for U.S. Patent Appl. No. 10/081,776 , filed February 20, 2002, 16 pages. | |
| | NPL10 | Office Communication, dated April 4, 2003, for U.S. Patent Appl. No. 10/081,776 , filed February 20, 2002, 18 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.
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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. |
| Sheet | 2 | of | 3 |
| | | Attorney Docket Number | 2513.002REX0 |

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| 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 number, publisher, city and/or country where published | T ² |
| | NPL11 | Office Communication, dated September 29, 2003 , for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 15 pages. | |
| | NPL12 | Office Communication, dated June 29, 2004 , for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 19 pages. | |
| | NPL13 | Office Communication, dated May 20, 2005 , for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 15 pages. | |
| | NPL14 | Office Communication, dated February 8, 2006 , for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 18 pages. | |
| | NPL15 | Office Communication, dated November 3, 2006 , for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 8 pages. | |
| | NPL16 | Office Communication, dated June 5, 2007 , for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 5 pages. | |
| | NPL17 | Office Communication, dated October 19, 2007 , for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 7 pages. | |
| | NPL18 | Office Communication, dated July 30, 2008 , for U.S. Patent Appl. No. 10/081,776, filed February 20, 2002, 4 pages. | |
| | NPL19 | Office Communication, dated April 29, 2008 , for U.S. Patent Appl. No. 10/418,646, filed April 18, 2003, 10 pages. | |
| | NPL20 | Office Communication, dated November 12, 2008 , for U.S. Patent Appl. No. 10/418,646, filed April 18, 2003, 14 pages. | |

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| | | First Named Inventor | James M. BARTON |
| | | Art Unit | 3992 |
| | | Examiner Name | Ferris III, Fred O. |
| Sheet | 3 | of | 3 |
| | | Attorney Docket Number | 2513.002REX0 |

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| 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 number, publisher, city and/or country where published | T ² |
|--------------------|-----------------------|---|----------------|
| | NPL21 | Office Communication, dated June 9, 2009 , for U.S. Patent Appl. No. 10/418,646, filed April 18, 2003 , 17 pages. | |
| | NPL22 | Office Communication, dated May 12, 2008 , for U.S. Patent Appl. No. 11/051,347, filed February 4, 2005 , 16 pages. | |
| | NPL23 | Office Communication, dated December 23, 2008 , for U.S. Patent Appl. No. 11/051,347, filed February 4, 2005 , 21 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. | | | | |
| Attorney Docket Number | 2513.002REX0 | | | | |
| Sheet | 1 | of | 1 | | |

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|--------------------|-----------------------|---|----------------|
| | NPL43 | U.S. COURT OF APPEALS FOR THE FEDERAL-CIRCUIT, TiVo Inc. v. Echostar Communications Corp. et al., Decision, Case No. 2006-1574, January 31, 2008. | |
| | NPL44 | U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Amended Final Judgment and Permanent Injunction, TiVo Inc. v. Echostar Communications Corp. et al., Case No. 2:04-CV-1-DF, June 2, 2009. | |
| | NPL45 | U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Complaint for Declaratory Relief, Dish Network Corp. v. Echostar Communications Corp., Case No. 1:08-CV-00327-JJF. | |
| | NPL46 | U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Memorandum Opinion, TiVo Inc. v. Echostar Communications Corp. et al., Case No. 2:04-CV-1-DF, June 2, 2009. | |
| | NPL47 | U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, TiVo Inc. v. Echostar Communications Corp. et al., Order granting stay, pending appeal, of order of U.S. District Court for the Eastern District of Texas (1) holding EchoStar in contempt of its previous injunction, (2) enjoining EchoStar, and (3) requiring that EchoStar take certain steps in light of its contempt holdings, July 1, 2009. | |
| | NPL48 | U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS, MARSHALL DIVISION, Order denying EchoStar's Motion to Suspend Proceedings on TiVo's Motion for Sanctions, July 14, 2009. | |
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| Reexamination  | Application/Control No. | Applicant(s)/Patent Under Reexamination |
| | 90/009,329 | 6233389 |
| | Certificate Date | Certificate Number |

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| <p>MORRISON & FOERSTER LLP 555 West Fifth Street, Suite 3500 Los Angeles, California 90013</p> | | | |

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| Case Name | | Director Initials |
| Open: 1:08cv327 Dish Network Corporation et al v. Tivo Inc | | <i>Eui</i> <i>Frank</i> <i>FS</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 | | |

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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 08/03/2009

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

EXAMINER

ART UNIT PAPER NUMBER

DATE MAILED: 08/03/2009

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



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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 1/07/2009. 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 ^{1-30, 32-60} 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 addresses claims 31 and 61 in the *ex parte* reexamination of United States Patent Number 6,233,389 issued to Barton et al for which a substantial new question of patentability has been determined to exist. Claims 31 and 61 are rejected.

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")

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

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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 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)

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:

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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

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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)

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 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

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(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)

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

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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 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 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;

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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 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.

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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

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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.

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

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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.

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

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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 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.

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;

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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 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

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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)

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.

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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)

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

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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)

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

In order to ensure full consideration of any amendments, affidavits or declarations, or other documents as evidence of patentability, such documents must be submitted in response to this Office action. Submissions after the next Office action, which is intended to be a final

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action, will be governed by the requirements of 37 CFR 1.116, after final rejection and 37 CFR 41.33 after appeal, which will be strictly enforced.

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.

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.

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

Amendment in Reexamination Proceedings

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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.

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

Application/Control Number: 90/009,329

Page 21

Art Unit: 3992

P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to:

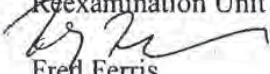
(571) 273-9900
Central Reexamination Unit

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



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 08/21/2009

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

EXAMINER

ART UNIT PAPER NUMBER

DATE MAILED: 08/21/2009

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



Sterne Kessler Goldstein & Fox, LLP
110 New York Avenue, N.W.
Washington, D.C. 2005

(For Patent Owner)

MAILED
AUG 21 2009
CENTRAL REEXAMINATION UNIT

Morrison & Foerster, LLP
555 West Fifth Street, Suite 3500
Los Angeles, CA 90013

(For Requester)

| | | |
|--------------------------------|---|----------------------|
| <i>In re Barton et al.</i> | : | |
| Reexamination Proceeding | : | DECISION ON PETITION |
| Control No.: 90/009,329 | : | UNDER 37 CFR 1.181 |
| Filed: November 10, 2008 | : | |
| For: U.S. Patent No. 6,233,389 | : | |

This is a decision on a petition filed by the patent owner on May 27, 2009 and third-party requester's opposition thereto. The petition is entitled "PETITION OF PATENT OWNER UNDER 35 USC §§ 1.181, 182 and/or 37 CFR 1.183..." [hereinafter "the petition"] and the opposition is titled "OPPOSITION TO PATENT OWNER'S PETITION TO VACATE..." [hereinafter "the opposition"]. The petition is treated as a petition under 37 CFR § 1.181 to invoke the supervisory authority of the director.

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

The petition is dismissed with respect to vacating the order under 37 CFR § 1.181.

REVIEW OF RELEVANT FACTS

1. U.S. Patent No. 6,233,389 issued on May 15, 2001.
2. A request for *ex parte* reexamination of that patent, Control No. 90/007,750 ("the '750 proceeding"), was filed by a third party requester on October 17, 2005.
3. In the '750 proceeding, a substantial new question of patentability was found with respect to U.S. Patent 6,304,714 to Krause et al. (Order of December 15, 2005).

4. In the '750 proceeding, U.S. Patent 6,018,612 to Thomason et al. was cited along with many other references in an information disclosure statement on March 7, 2006. The citation was later initialed by the examiner.
5. The present request for reexamination ("the '329 proceeding") was filed November 10, 2008. Reexamination of Claims 31 and 61 was requested in light of the Krause and Thomason patents.
6. The electronic record of the '750 proceeding indicates that a certificate confirming the patentability of Claims 1-61 issued on November 11, 2008.
7. On January 7, 2009, reexamination was ordered in the '329 proceeding. A substantial new question of patentability was found with respect to a combination of the Krause and Thomason patents (page 2).
8. The petition was filed by patent owner on May 27, 2009.
9. The opposition was filed by third-party requester on June 10, 2009.

DECISION

The present petition asks the USPTO to vacate the order of January 7, 2009. An order granting reexamination is not a final agency action but is a determination that proceedings are to begin. See *Heinl v. Godici*, 143 F. Supp. 2d 593, 597 (observing that the decision to grant reexamination "is an intermediate, indeed initial, step in the agency process to resolve the question of the validity of a patent", and confirming that such a decision is not subject to judicial review.)

Because this is ultimately an appealable issue, rather than an issue that is appropriately resolved by petition. Patent owner's proper recourse now is through response to any action on the merits.

Nonetheless, taken as a request for supervisory review, patent owner has not demonstrated error by the examiner.

The Thomason reference, while cited in the '750 proceeding, was not discussed by the examiner in that proceeding. In 2002, 35 USC § 303 was amended to read "The existence of a substantial new question of patentability is not precluded by the fact that a patent or printed publication was previously cited by or to the Office or considered by the Office" (emphasis added). In the facts of the '329 proceeding, the Thomason reference was previously cited to the office along with

roughly 200 other documents, but not discussed by the examiner¹. This is highlighted on page 2 of the opposition to this petition.

Patent owner asserts that “Statements such as those made by Primary Examiners Harvey and Escalante when allowing claims over cited references must be taken objectively, at their face value: that they considered all portions of the cited references they said were considered, and that they determined that those references do not invalidate the claims for the expressly stated reasons. In other words, examiners should not be forced to discuss in detail every single cited reference by name.” While Patent Owner has demonstrated that the references were considered by the Office, that alone fails to prohibit reexamination given section 303’s express language that such prior consideration does not preclude the existence of a substantial new question.

Previously, the rule set forth in *In re Portola Packaging* might have forbidden a reexamination under these circumstances.

“Therefore, it must be presumed that the original examiner considered the Faulstich and Hunter patents, both alone and in combination with each other and with all of the other cited references, before allowing the original claims... Whether the earlier examination was correct or not, reexamination of the same claims in light of the same references does not raise a substantial new question of patentability, which is the statutory criterion for reexamination.” (*In re Portola Packaging*, 110 F.3d 786)

However, the 2002 amendment to 35 USC § 303 reflected a deliberate decision by Congress to overrule this decision. As such, a second reexamination may be ordered on references previously cited and/or considered. This change was discussed in *In re Swanson*.

Thus, under § 303(a) as amended, a reference may present a substantial new question even if the examiner considered or cited a reference for one purpose in earlier proceedings. Nothing in the statute creates an exception to this rule for references considered in the context of a rejection of prior claims. Indeed, such an exception would overwhelm the rule and thwart a central purpose of the amendment, to overrule *In re Portola Packaging*. In that case, as here, the issue was whether a piece of prior art relied on for a prior rejection could nevertheless create a new question of patentability sufficient to warrant a reexamination. (*In re Swanson*, 540 F. 3d 1368 (Fed. Cir. 2008))

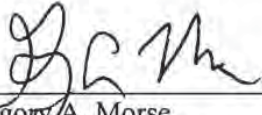
As the order granting reexamination identifies what feature was not found in the ‘750 reexamination (page 4), where those elements are shown in the Thomason reference (page 6), and concludes that this feature would be important to a reasonable examiner (page 8), and as the 2002 amendment to 35 USC § 303 makes clear that references already of record may be used to find that a substantial new question of patentability is present, the decision of the examiner has not been shown to be in error.

¹ A review of the record of the ‘750 proceeding did not reveal any specific discussion of Thomason. If such a discussion exists it should be brought to the attention of the Office in a request for reconsideration of this petition.

Accordingly, the petition is dismissed.

CONCLUSION

1. The petition, taken as a petition under 37 CFR 1.181, is dismissed.
2. Telephone inquiries related to this decision should be directed to Jessica Harrison, Supervisory Patent Examiner, at (571) 272-4449 or in her absence to the undersigned at (571) 272-3838.
3. This decision is without prejudice to a request for reconsideration or higher-level review. See MPEP 1002.02.



Gregory A. Morse

Director

Central Reexamination Unit



UNITED STATES PATENT AND TRADEMARK OFFICE

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. |
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| 90/009,329 | 11/10/2008 | 6233389 | 2513.002REX0 | 2859 |

26111 7590 09/14/2009

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
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WASHINGTON, DC 20005

EXAMINER

ART UNIT PAPER NUMBER

DATE MAILED: 09/14/2009

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



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
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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**
SEP 14 2009

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
www.uspto.gov

Stenme Kessler Goldstein & Fox, LLP
110 New York Avenue, N.W.
Washington, D.C. 2005

(For patent Owner)

MAILED

SEP 14 2009

Morrison & Foerster, LLP
555 West Fifth Street, Suite 3500
Los Angeles, CA 90013

(For the Third-Party Requester)

CENTRAL REEXAMINATION UNIT

In re Barton et al.
Ex Parte Reexamination Proceeding
Control No.: 90/009,329
Filed: November 10, 2008
For: U.S. Patent No. 6,233,389

: **DECISION DIMISSING**
: **PETITION FOR SUSPENSION**
: **OF EX PARTE**
: **REEXAMINATION**
: **PROCEEDING**

This is a decision on the petition under 37 CFR § 1.182 filed by the patent owner on May 27, 2009, requesting a temporary suspension of the above-identified *ex parte* reexamination proceeding.

The petition is before the Office of Patent Legal Administration.

The petition is dismissed.

DECISION

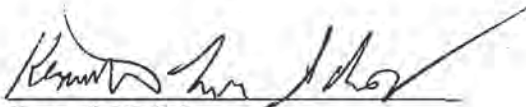
In the petition under 37 CFR § 1.182, the patent owner requested the United States Patent and Trademark Office (USPTO) to temporarily suspend prosecution of the above-identified reexamination proceeding until the USPTO decides the concurrently filed "PETITION OF PATENT OWNER UNDER 37 C.F.R. § 1.181, 182 AND/OR 37 C.F.R. § 1.183 TO VACATE THE ORDER GRANTING SECOND REEXAMINATION REQUEST" (hereinafter "the concurrently filed petition"). The patent owner in the concurrently filed petition requested the USPTO to vacate the reexamination order mailed on January 7, 2009, which has been treated as a petition under 37 CFR § 1.181, to invoke the supervisory authority of the Director. On August 21, 2009, the USPTO mailed a decision on the concurrently filed petition, dismissing the petition with respect to vacating the reexamination order mailed on January 7, 2009.

Since the concurrently filed petition that is relied upon by the patent owner as the basis for its request for suspension has been decided, and there is no other justification offered by the patent owner to suspend the examination in the above-identified reexamination proceeding, the petition under 37 C.F.R. § 1.182, requesting a temporary suspension of the above-identified reexamination proceeding, must be dismissed. 35 U.S.C. § 305 mandates that *ex parte* reexamination proceedings must be conducted "with special dispatch within the Office."

In view of the above and the fact situation presented by the present record, the patent owner's petition under 37 C.F.R. § 1.182, requesting a temporary suspension of the above-identified reexamination proceeding, is dismissed.

CONCLUSION

- 1) The patent owner's petition under 37 C.F.R. § 1.182 filed on May 27, 2009, requesting a temporary suspension of the above-identified reexamination proceeding, is dismissed.
- 2) Jurisdiction over the above-identified reexamination proceeding is being forwarded to the Central Reexamination Unit (CRU) for further processing not inconsistent with this decision.
- 3) The USPTO mailed an Office action on August 3, 2009, which sets forth a two-month shortened statutory period for response. This time period for response continues to run from the mailing date of the Office action. Failure to respond within this time period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with the Office action.
- 4) Telephone inquiries related to this decision should be directed to Joni Y. Chang, Senior Legal Advisor, at (571) 272-7720.



Kenneth M. Schor
Senior Legal Advisor
Office of Patent Legal Administration



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

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

26111 7590 09/22/2009

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

EXAMINER

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

DATE MAILED: 09/22/2009

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



DO NOT USE IN PALM PRINTER

(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

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, Alex Kosowski (PTO) (4) Edward Kessler, Lori Gordon (Sterne/Kessler)

Date of Interview: 22 September 2009

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: 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:
Patent owner presented an overview of the '389 Patent and the claimed limitations as they related to Figure 8 disclosing sources, transforms, and sinks. PTO representatives expressed concern that the explanation based on Figure 8 was too high level and indicated that arguments directed toward the process of Figures 6 and 9 would be more helpful in clarifying any differences between the claimed subject matter and the combination of Thomason and Krause.

(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)



Robert Greene Sterne
Jorge A. Goldstein
David K.S. Comwell
Robert W. Edmond
Tracy-Gene G. Durkin
Michele A. Cimbala
Michael B. Ray
Robert E. Sokohl
Eric K. Steffe
Michael Q. Lee
John M. Covert
Robert C. Milnig
Donald J. Featherstone
Timothy J. Shea, Jr.
Michael V. Messinger
Judith U. Kim
Mark Fox Evans
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Eldora L. Ellison
Donald R. Banowitz
Peter A. Jackman
Brian J. Del Buono

Elizabeth J. Haanes
Michael D. Specht
Kevin W. McCabe
Glewn J. Perry
Theodore A. Wood
Gaby L. Longworth
Edward W. Yee
Grant E. Reed
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Jon E. Wright
LuAnne M. DeSantis
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Cynthia M. Bouchez
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Lei Zhou
W. Blake Coblenz

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John T. Haran
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Michael R. Malek
Carla Ji-Eun Kim
Doyle A. Siever*
Ulrike Winkler Jenks
Paul A. Calvo
C. Matthew Rozier
Randall K. Baldwin
Lori M. Brandes
Deborah A. Sterling
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Kellie K. DiNapoli*
Richard B. Almon**
Christopher B. Ferenc*
Jeffrey R. Fougere*
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Registered Patent Agents*
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Cynthia L. DeRenzo
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R. Wilson Powers III
Enn C. Wong
Joseph E. Mutschelknaus
Kavon Nasabzadeh
Aaron S. Ward

Of Counsel
Edward J. Kessler
Kenneth C. Bass III
Christopher P. Wrist
David C. Isaacson
Jason D. Eisenberg

*Admitted only in Maryland
**Admitted only in Virginia
*Practice Limited to
Federal Agencies

September 24, 2009

WRITER'S DIRECT NUMBER:
(202) 772-8550

INTERNET ADDRESS:
EKESSLER@SKGF.COM

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

Art Unit 3992
Confirmation No.: 2859
Attn: Mail Stop Ex parte Examination

Re: U.S. Reexamination of U.S. Patent No. 6,233,389
Control No. 90/009,329; Filing or 371(c) Date: 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. Petition for Extension of Time to File Response to First Office Action dated August 3, 2009 Pursuant to 37 C.F.R. § 1.550(c);
2. Certification of Service of Petition for Extension of Time to File Response to First Office Action dated August 3, 2009 Pursuant to 37 C.F.R. § 1.550(c); and
3. Online Credit Card Payment Authorization in the amount of **\$200.00** to cover:
\$200.00 Payment for Petition for Extension of Time to File Response to First Office Action Pursuant to 37 C.F.R. § 1.550 (c).

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

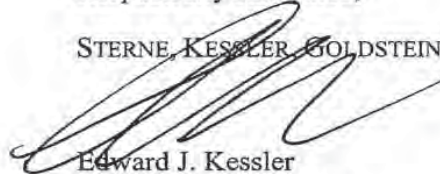
In the event that extensions of time are necessary to prevent abandonment of this patent application, then such extensions of time are hereby petitioned.

Commissioner for Patents
September 24, 2009
Page 2

Fee payment is provided through online credit card payment. 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 Applicants
Registration No. 25,688

EJK/jdp
Enclosure(s)
1033819.v1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re reexamination of:

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

Control No.: 90/009,329

Filed: November 10, 2008

For: **Multimedia Time Warping
System**

Confirmation No.: 2859

Art Unit: 3992

Examiner: FERRIS, Frederick

Atty. Docket: 2513.002REX0

**Petition for Extension of Time to File Response to First Office Action
Pursuant to 37 C.F.R. § 1.550(c)**

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

Dear Sir:

Pursuant to 37 C.F.R. § 1.550(c), the patent owner, TiVo Inc. ("TiVo"), hereby petitions for a one month extension of time to reply to the first Office Action issued on August 3, 2009 in the above captioned case. The new deadline for response in the case would be November 3, 2009. A petition fee under 37 C.F.R. § 1.17(g) has been submitted with the present petition.

Upon notification that an Office Action issued in the present reexamination, TiVo and its undersigned counsel (collectively "TiVo") took the following actions to prepare a full and complete response to the Office Action. First, TiVo sought to find a qualified technical expert to assist with an analysis of the technical issues. Second, TiVo began to collect evidence of secondary considerations of non-obviousness, including, but not limited to, evidence of commercial success of the claimed invention. In addition, TiVo began to prepare evidence and a demonstration to be used at an anticipated interview that TiVo planned to conduct with the Examiners.

By about August 10, 2009, TiVo retained the services of Dr. John Villasenor to assist with a technical analysis of the Office Action, the '389 patent at issue, and the two references applied to reject claim 31 and 61 of the '389 patent. Since retaining Dr. Villasenor, TiVo has worked diligently to conduct its technical analysis and to prepare for the anticipated interview.

The '389 patent is currently involved in litigation with the Requestor, Dish Network Corporation (successor to EchoStar Communications Corp.), *TiVo Inc. v. EchoStar Communications Corporation, et al.* The contempt phase of this litigation is currently on appeal to the Court of Appeals for the Federal Circuit. A hearing is expected later this year. Therefore, as part of TiVo's preparation for the response to the Office Action, TiVo's undersigned counsel and Dr. Villasenor have worked closely with TiVo's litigation counsel to avoid the possibility of taking conflicting positions between the litigation and this reexamination.

On September 22, 2009, TiVo conducted an interview with Primary Examiners Ferris and Kosowski and Supervisory Patent Examiner (SPE) Keasel to discuss the TiVo invention as embodied in the '389 patent, and more particularly, in claims 31 and 61. TiVo also presented arguments in support of its position that neither the Thomason nor Krause references, whether considered separately or in any rational combination, render claims 31 or 61 obvious under 35 U.S.C. §103(a).

During the course of the interview, the Examiners made suggestions as to what they believed should be incorporated into a written response to the Office Action to permit them to give favorable consideration to TiVo's arguments. In order to comply with the Examiner's suggestions, and to enable TiVo to gather the evidence necessary to support its secondary consideration position, TiVo requires additional time beyond the current due date of October 3, 2009

Based on the foregoing, TiVo respectfully submits that the current circumstances represent "sufficient cause" under 37 C.F.R. § 1.530. TiVo therefore respectfully requests that this Petition be granted and that the time period for response be extended by one month.

Respectfully submitted,

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



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

Lori A. Gordon
Attorney for Patent Owner
Registration No. 50,633

Date: September 24, 2009

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

1033410_1.DOC

Patent Under Reexamination: U.S. Patent No. 6,233,389
Reexamination Control No.: 90/009,329
Examiner: Ferris, Frederick
Art Unit: 3992

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

Sir:

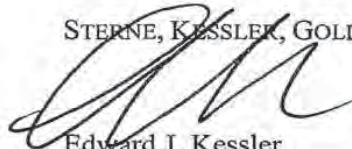
**CERTIFICATION OF SERVICE OF PETITION FOR EXTENSION OF TIME
TO FILE RESPONSE TO FIRST OFFICE ACTION PURSUANT TO 37 C.F.R.
§ 1.550(C)**

In compliance with 37 C.F.R. § 1.550(f), the undersigned, on behalf of the Patent Owner, hereby certifies that a copy of this paper has been served on the Third Party Requester by first class mail on September 24, 2009. The name and address of the attorney representing the Third Party Requester served is as follows:

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

Respectfully submitted,

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



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

Date: September 24, 2009

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

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: | Edward J. Kessler |
| 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: | | | | |
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Petition fee- 37 CFR 1.17(g) (Group II) | 1463 | 1 | 200 | 200 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--------------------------|----------|----------|--------|----------------------|
| Miscellaneous: | | | | |
| Total in USD (\$) | | | | 200 |

Electronic Acknowledgement Receipt

| | |
|---|--------------------------------|
| EFS ID: | 6140785 |
| 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: | Edward J. Kessler |
| Filer Authorized By: | |
| Attorney Docket Number: | 2513.002REX0 |
| Receipt Date: | 24-SEP-2009 |
| Filing Date: | 10-NOV-2008 |
| Time Stamp: | 16:56:04 |
| Application Type: | Reexam (Patent Owner) |

Payment information:

| | |
|--|-------------|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | \$200 |
| RAM confirmation Number | 3120 |
| Deposit Account | |
| Authorized User | |

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|-----------|-------------------------------------|------------------|------------------|
|-----------------|----------------------|-----------|-------------------------------------|------------------|------------------|

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|---|-------------------------|---|--|------------|---|
| 1 | | 2513_002REX0_PetitionforExtensionofTime.pdf | 207244 9f68bed3b704c971bb931c20204592c956d9c598 | yes | 6 |
| Multipart Description/PDF files in .zip description | | | | | |
| | | Document Description | Start | End | |
| | | Miscellaneous Incoming Letter | 1 | 2 | |
| | | Receipt of Petition in a Reexam | 3 | 6 | |
| Warnings: | | | | | |
| Information: | | | | | |
| 2 | Fee Worksheet (PTO-875) | fee-info.pdf | 30178 7158e81f7d2a280b66ad05913df52cb0cf27946 | no | 2 |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 237422 | | |
| <p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p> | | | | | |

ARTIFACT SHEET

Enter artifact number below. Artifact number is application number + artifact type code (see list below) + sequential letter (A, B, C ...). The first artifact folder for an artifact type receives the letter A, the second B, etc..

Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB

90009329CA

Indicate quantity of a single type of artifact received but not scanned. Create individual artifact folder/box and artifact number for each Artifact Type.

CD(s) containing:

computer program listing

Doc Code: Computer

Artifact Type Code: P

pages of specification

and/or sequence listing

and/or table

Doc Code: Artifact

Artifact Type Code: S

content unspecified or combined

Doc Code: Artifact

Artifact Type Code: U

Stapled Set(s) Color Documents or B/W Photographs

Doc Code: Artifact Artifact Type Code: C

Microfilm(s)

Doc Code: Artifact Artifact Type Code: F

Video tape(s)

Doc Code: Artifact Artifact Type Code: V

Model(s)

Doc Code: Artifact Artifact Type Code: M

Bound Document(s)

Doc Code: Artifact Artifact Type Code: B

Confidential Information Disclosure Statement or Other Documents marked Proprietary, Trade Secrets, Subject to Protective Order, Material Submitted under MPEP 724.02, etc.

Doc Code: Artifact Artifact Type Code X

Other, description: _____

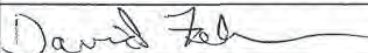
Doc Code: Artifact Artifact Type Code: Z

March 8, 2004

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

| | | |
|--|------------------------|-------------------|
| TRANSMITTAL FORM | Control No. | 90/009,329 |
| | Filed | November 10, 2008 |
| | U.S. Patent No. | 6,233,389 |
| | Confirmation No. | 2859 |
| Total Number of Pages in This Submission | Attorney Docket Number | 454032801100 |

| ENCLOSURES (Check all that apply) | | |
|---|---|--|
| <input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53 | <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD | <input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) – (Including Appendices and Certificate of Service) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): 1) Notice Under 37 C.F.R. § 1.565 and MPEP 2282 (including the Certificate of Service) 2) Federal Circuit's Calendar Announcement (1 page) |
| Remarks | | |

| SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT | | | |
|--|---|----------|--------|
| Firm Name | MORRISON & FOERSTER LLP (Customer No. 25224) | | |
| Signature |  | | |
| Printed name | David L. Fehrman | | |
| Date | September 25, 2009 | Reg. No. | 28,600 |

EFS-WEB

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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

Examiner: Fred O. Ferris, III

Application No.: 90/009,329

Art Unit: 3992

Filed: November 10, 2008

For: MULTIMEDIA TIME WARPING SYSTEM

NOTICE UNDER 37 C.F.R. § 1.565 AND MPEP 2282

MS Ex Parte Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

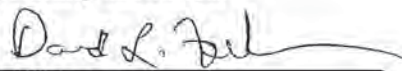
The above-identified reexamination of U.S. Patent No. 6,233,389 is co-pending with an action styled *TiVo, Inc. v. EchoStar Corp., et al.* in the United States District Court for the Eastern District of Texas. The litigation is currently on appeal to the United States Court of Appeals for the Federal Circuit. The Federal Circuit recently posted its calendar indicating that the appeal will be heard on November 2. The relevant portion of the calendar announcement is attached.

The Requester petitions for any required relief and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to

Deposit Account No. 03-1952.

Dated: September 25, 2009

Respectfully submitted,

By 

David L. Fehrman

Registration No.: 28,600
MORRISON & FOERSTER LLP
555 West Fifth Street, Suite 3500
Los Angeles, California 90013
(213) 892-5601

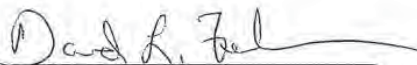
la-1046839

CERTIFICATE OF SERVICE

The undersigned, on behalf of the Requester, hereby certifies that a copy of each of the following documents:

1. Transmittal Letter (1 page);
2. Notice Under 37 C.F.R. § 1.565 and MPEP 2282 (2 pages, including this certificate);
3. A portion of the Federal Circuit's Calendar Announcement (1 page)

was served on the Patent Owner via first class mail on September 25, 2009. The name and address of the party served is as follows: Edward Kessler, Sterne Kessler Goldstein Fox, 1100 New York Ave, N.W., Washington, D.C. 20005.


David L. Fehrman

Panel L: Thursday, October 8, 2009, 10:00 A.M., Courtroom 203

| | | | |
|-----------|------|---------------------------------|-----------------|
| 2009-3046 | MSPB | DOMINGUEZ V OPM | [argued] |
| 2009-1086 | DCT | VERIZON SERVICES V COX FIBERNET | [argued] |
| 2009-5025 | CFC | CNG TRANSMISSION V US | [argued] |
| 2008-3285 | MSPB | CARSON V ENERGY | [on the briefs] |
| 2009-1216 | DCT | AVTL IDENTIFI V CRYSTAL IMPORT | [on the briefs] |
| 2009-3198 | MSPB | BENFIELD V ARMY | [on the briefs] |

Panel M: Thursday, October 8, 2009, 2:00 P.M., Courtroom 201

| | | | |
|-----------|------|--------------------------|-----------------|
| 2009-1091 | DCT | SMITH & NEPHEW V ARTHREX | [argued] |
| 2009-5030 | CFC | FORBES V US | [argued] |
| 2009-1237 | DCT | INTL SEAWAY V WALGREENS | [argued] |
| 2009-3041 | MSPB | MYNARD V OPM | [on the briefs] |
| 2009-3199 | MSPB | WINFIELD V VA | [on the briefs] |

Panel N: Friday, October 9, 2009, 10:00 A.M., Courtroom 201

| | | | |
|-----------|------|-----------------------------------|-----------------|
| 2009-1095 | DCT | JOYAL PRODUCTS V JOHNSON ELECTRIC | [argued] |
| 2009-3103 | MSPB | HARDING V VA | [argued] |
| 2009-5058 | CFC | YANT V US | [argued] |
| 2009-3071 | MSPB | DORSEY V OPM | [on the briefs] |
| 2009-3203 | MSPB | FLOCH V VA | [on the briefs] |

Panel O: Friday, October 9, 2009, 10:00 A.M., Courtroom 402

| | | | |
|-----------|------|--------------------------------|-----------------|
| 2009-1078 | DCT | MONSANTO COMPANY V DAVID | [argued] |
| 2009-1172 | PTO | COLD WAR MUSEUM V COLD WAR AIR | [argued] |
| 2009-3112 | MSPB | JARDIM V ARMY | [argued] |
| 2009-3132 | MSPB | MAPLES V OPM | [on the briefs] |
| 2009-3205 | MSPB | WALL V OPM | [on the briefs] |

Panel P: Friday, October 9, 2009, 10:00 A.M., Courtroom 203

| | | | |
|-----------|------|-----------------------------------|-----------------|
| 2009-1102 | DCT | ADVANCED MAGNETIC V ROME FASTENER | [argued] |
| 2009-1142 | DCT | INTELLECT SCIENCE V SONY ELECTRON | [argued] |
| 2009-1223 | PTO | IN RE ROTH | [argued] |
| 2009-3151 | MSPB | WILEY V MSPB | [argued] |
| 2009-3137 | MSPB | ROSS V MSPB | [on the briefs] |
| 2009-3208 | MSPB | BAKER V ARMY | [on the briefs] |

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

November Calendar Announcement
(This calendar is subject to revision.)

rev. 9/22/2009

Panel A: Monday, November 2, 2009, 10:00 A.M., Courtroom 201

| | | | |
|-----------|-----|---------------------------------|-----------------|
| 2009-1022 | DCT | MEDIA TECHNOLOGIES V UPPER DECK | [argued] |
| 2009-7037 | CVA | DOUGLAS V DVA | [argued] |
| 2009-5053 | CFC | TEKKNOWLEDGE CORPORATION V US | [argued] |
| 2009-1374 | DCT | TIVO V EHOSTAR | [argued] |
| 2009-5093 | CFC | THOMAS V US | [on the briefs] |

Electronic Acknowledgement Receipt

| | |
|---|--------------------------------|
| EFS ID: | 6149121 |
| 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: | David L. Fehrman/Dena Wells |
| Filer Authorized By: | David L. Fehrman |
| Attorney Docket Number: | 2513.002REX0 |
| Receipt Date: | 25-SEP-2009 |
| Filing Date: | 10-NOV-2008 |
| Time Stamp: | 16:00:04 |
| Application Type: | Reexam (Third Party) |

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| Multipart Description/PDF files in .zip description | | | |
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| Document Description | | Start | End |
| Reexam Miscellaneous Incoming Letter | | 1 | 1 |
| Reexam Notice of Court Action | | 2 | 2 |
| Reexam Certificate of Service | | 3 | 3 |
| Reexam Miscellaneous Incoming Letter | | 4 | 4 |

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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.



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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 09/30/2009

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

EXAMINER

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

DATE MAILED: 09/30/2009

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

SEP 30 2009

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

David L Fehrman :
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: 10 November 2009 : OF TIME
For: US Patent No. 6,233,389 : 37 CFR §§ 1.550(c) & 1.181

MAILED
SEP 30 2009
CENTRAL REEXAMINATION UNIT

This is a decision on the 24 September 2009, "Petition for Extension of Time to File Response to First Office Action Pursuant to 37 CFR § 1.550(c)" requesting that the time for responding to the non-final Office action mailed 03 August 2009, be extended by one (1) month extension of time. The petition was timely filed on 24 September 2009. The petition included the required petition fee pursuant to 37 CFR § 1.17(g) and certificate of service.

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

The petition is granted for the reasons set forth below.

DISCUSSION

The Patent Owner requests the period of time be extended in which to file a response to the Office action mailed 03 August 2009, which set a two (2) month date for filing a response thereto. The Office action is a non-final Office action. The petition for extension of time was timely filed on 24 September 2009 with appropriate fee according to 37 CFR § 1.17(g).

The extension of time is granted

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. ...

MPEP 2265 (in-part)

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.

ANALYSIS AND FINDINGS

The patent owner’s representative petition to extend the period for response by adding one (1) month 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 petitioner has demonstrated "sufficient cause" the petition outlining the factual accounting of reasonably diligent behavior by those responsible for preparing a response as well as the need for a technical expert to discuss the need for evidence of non-obviousness by secondary considerations including but not limited to evidence of commercial success.

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

CONCLUSION

1. The patent owner's petition for extension of time is hereby granted.
2. The time for response to the non-final Office action is extended by one (1) month
3. The Patent Owner's response is due 03 November 2009.
4. Response and/or submissions to the Office to change the correspondence address or power of attorney in the record of the patent should be addressed as follows:

By Mail to: Mail Stop *Ex Parte* Reexam
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By Fax to: (571) 273-9900
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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 event that Mark Reinhart is unavailable 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 may also be contacted..

/Mark Reinhart/
for

Gregory Morse
Director,
Central Reexamination Unit 3999

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re reexam of:
U.S. Patent 6,233,389

Reexam Control No.: 90/009,329

Filed: November 10, 2008

For: **Multimedia Time Warping System**

Confirmation No.: 2859

Art Unit: 3992

Examiner: FERRIS, Frederick

Atty.Docket: 2513.002REX0

**Reply to Office Action in *Ex Parte* Reexamination and
Statement of Substance of Interview under 37 C.F.R. § 1.560**

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

Sir:

In reply to the Office Action in *Ex Parte* Reexamination dated July 30, 2007, the Patent Owner, TiVo Inc. (hereafter "TiVo") submits the following Listing of Claims and Remarks.

In compliance with 37 C.F.R. § 1.560, TiVo submits the following Statement of Substance of Interview conducted on September 22, 2009, between Primary Examiners Ferris and Kosowski, and Supervisory Primary Examiner Keasel, and Patent Owner's representatives, James Barton, co-inventor and co-founder of TiVo, Dr. John Villasenor, Professor of Electrical Engineering, University of California, Los Angeles, TiVo's technical expert, and Edward J. Kessler and Lori A. Gordon, counsel for TiVo.

It is not believed that extensions of time beyond those already requested and granted or other fees are required. However, if any fees are necessary to prevent abandonment of this application, then such fees are hereby petitioned and hereby authorized to be charged to our Deposit Account No. 19-0036.

Listing of the Patent Claims

A listing of the status of each claim under reexamination is provided below.

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

Independent claims 31 and 61 are currently pending in the reexamination proceeding of U.S. Patent No. 6,233,389 ("the '389 patent"). Claims 1-30 and 32-60 were previously confirmed in Reexamination Control No. 90/007,750, filed October 17, 2005. Additionally, claims 31 and 61 were confirmed in the prior reexamination. TiVo objects to this reexamination proceeding generally for the reason that the Requestor has not presented a substantial new question of patentability with respect to claims 31 and 61. Nor has the USPTO found *sua sponte* a substantial new question of patentability.

Based on the following remarks, TiVo respectfully requests that the Examiner reconsider all outstanding rejections on the remaining claims, and that they be withdrawn.

I. Statement of Substance of Interview

TiVo thanks Examiners Ferris, Keasel, and Kosowski for the courtesy extended to TiVo's representatives, James M. Barton, John D. Villasenor, Edward J. Kessler, and Lori A. Gordon, during the interview conducted on September 22, 2009.

During the interview, TiVo's representatives explained how the invention defined by claims 31 and 61 operates, the differences between the invention of claims 31 and 61 and the cited references, U.S. Patent No. 6,018,612 to Thomason, *et al* ("Thomason"), and U.S. Patent No. 5,949,948 to Krause, *et al* ("Krause"), and why it would not have been obvious to one of ordinary skill in the art at the time the invention of claims 31 and 61 was made to combine Thomason and Krause and thereby arrive at the claimed invention. The Examiner's Statement of the Interview states:

PTO representatives expressed concern that the explanation based on Figure 8 was too high level and indicated that arguments directed toward to [sic] process of Figures 6 and 9 would be more helpful in clarifying any differences between the claimed subject matter and the combination of Thomason and Krause.

Ex Parte Reexamination Interview Summary, page 3.

TiVo notes that FIG. 6 "is a schematic diagram of the construction of a PES buffer." In addition, FIG. 9 represents an embodiment specifically related to flow control aspects of the claim discussion below.

II. Overview of the '389 Patent

The '389 patent describes a multimedia time warping method and apparatus for simultaneously storing and playing back multimedia data. As described in the '389 patent, a source object extracts video and audio data from a physical data source. A transform object stores data streams onto and retrieves data streams from a storage device. The source object, which is automatically controlled by the transform object, obtains a buffer from the transform object, converts video data into data streams and fills the buffer with the data streams. A sink object, which is also automatically controlled by the transform object, obtains data stream buffers from the transform object and outputs the data streams to a video and audio decoder. The decoder converts the streams into display signals. A control object receives commands from a user, which control the flow of the broadcast data through the system. The control object sends flow command events to the source, transform, and sink objects. (See '389 patent, 2:15-33.)

The use of the source object, transform object, and sink object as described above allows for the simultaneous storing and playback of multimedia data. (See Barton Declaration, ¶ 7.) As described in the '389 patent, one embodiment of the invention

receives television broadcast signals in any of a multitude of formats (e.g., NTSC, ATSC, DSS or DBS) and converts the received signals into an MPEG formatted stream for internal transfer and manipulation. ('389 patent, 3:64 - 4:2.)

III. Rejection Under 35 U.S.C. §103

Claims 31 and 61, the only claims at issue in this reexamination proceeding, have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Thomason in view of Krause. TiVo respectfully traverses this rejection.

A. Summary of Principle Arguments

1. The combination of Thomason and Krause fails to disclose “[a] source object ... automatically flow controlled by [a] transform object” as recited in claims 31 and 61.

2. The combination of Thomason and Krause fails to disclose “[a] sink object ... automatically flow controlled by [a] transform object” as recited in claims 31 and 61.

3. Combining Krause with Thomason adds nothing of value to Thomason and would fundamentally and impermissibly change the principle of operation of Thomason .

TiVo points out here that at the present time it is relying primarily on the above-identified arguments in support of patentability of claims 31 and 61. TiVo believes that these areas of distinction of claims 31 and 61 over the cited references are more than sufficient to establish the patentability of claims 31 and 61. Additional arguments directed to further areas of difference between the invention of claims 31 and 61 and the

cited references can also be made. TiVo reserves the right to present such additional arguments if or when it becomes necessary to do so.

B. Similarity of Claims 31 and 61

Claims 31 and 61 are similar in that the substance of the relevant portions of the two claims, as discussed in more detail below, are nearly identical. Thus claims 31 and 61 will be treated together for purposes of the following arguments.

IV. Detailed Discussion of Arguments

A. "Source Object".

The Office Action states:

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

(Office Action, p. 6 referring to claim 31; Office Action, p. 13, referring to claim 61.)

The text from the '389 patent cited in the Office Action in support of this construction states that "[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." ('389 patent, 8:43-45.) While this text describes one of the actions that can be taken by the source object, the source object acts, and is acted on, in the system in other ways as well. (See Villasenor Declaration, ¶ 26.)¹

In relevant part, claim 31 recites:

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

¹ References to "Villasenor Declaration" are to specific paragraphs of the Declaration of John D. Villasenor, submitted herewith as Appendix A.

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;

('389 patent, 14:59-67.)(emphasis added.)

Similarly, claim 61 in relevant part recites:

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;

('389 patent, 18:9-18.)(emphasis added.)

It is clear that the "source object" as claimed in the '389 patent does much more than place data from a source in a buffer as stated in the Office Action. Thus the interpretation of "source object" presented in the Office Action is improper. (See Villasenor Declaration, ¶ 26.)

B. Thomason does not disclose a "source object" as claimed.

Thomason is directed specifically to combining an input and output buffer memory into a single memory (element 35 in figure 1). (Villasenor Declaration, ¶ 22)

The Office Action alleges that the operation of DMA controller 31 under the supervision of microprocessor 24 in Thomason is the "source object" recited in claims 31 and 61. Specifically, the Office Action states:

[T]he operation of the 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.

(Office Action, page 6, referring to claim 31; Office Action, page 13, referring to claim 61)

Thomason discloses that the operation of DMA controller 31 under the supervision of microprocessor 24 - i.e., the source object . . .

(Office Action, page 7, referring to claim 31; Office Action, page 14, referring to claim 61)

The Office Action further alleges that the operation of DMA controller 32 as supervised by microprocessor 24 in Thomason is the "transform object" recited in claims 31 and 61. Specifically, the Office Action states:

[t]he operation of DMA controller 32 as supervised by microprocessor 24 - i.e., the transform object

(Office Action, page 7, referring to claim 31; Office Action, pages 14-15, referring to claim 61.)

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.

(Office Action, page 8, referring to claim 31; Office Action, page 15, referring to claim 61.)

In discussing the claim element "wherein said source object is automatically flow controlled by said transform object," the Office Action states:

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).

(Office Action, page 7, referring to claim 31; Office Action, page 15, referring to claim 61; parentheses and citation in the original).

The portion of Thomason cited in the Office Action is reproduced below.

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.

(Thomason, 4:43-51.)

Nowhere does Thomason disclose or suggest the control of data flow from buffers 4 into the "input data" side of buffer 35 as argued in the Office Action. (Villasenor Dec. 23). In contrast, the design in Thomason is explicitly aimed at a system in which there is no flow control into buffer 35 from buffers 4. (See Villasenor Dec. 23)

The claim element

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

requires that the transform object act to carry out flow control of the source object. Nothing in the Thomason text at 4:43-51 or elsewhere in Thomason teaches or suggests that "the operation of DMA controller 31 under the supervision of microprocessor 24" - the elements of Thomason that the Office Action has identified as the source object - is automatically flow controlled by "[t]he operation of DMA controller 32 as supervised by microprocessor 24" - the elements of Thomason that the office action has identified as the transform object.

The portion of Thomason cited in the Office Action as showing the "wherein said source object is automatically flow controlled by said transform object" claim element as it allegedly relates to the main memory ("until the main memory 36 is available to receive data") pertains to operations of Thomason occurring *downstream from, and after*, the transfer of data from buffers 4 to buffer 35. The action of DMA controller 31 in

transferring data from buffers 4 to buffer 35, or the action of microprocessor 24 in instructing DMA controller 31 to perform this transfer, do not constitute “automatic flow control” of the storage data pipeline. (See Villasenor Declaration, ¶ 31.)

By contrast, the '389 patent specifically describes automatic flow control involving, for example, the need for the source object to obtain a buffer from the (downstream) transform object, and explains that the self-regulating pipeline associated with storage in this design has automatic flow control:

To obtain the buffer, the source object 901 asks the down stream object in his pipeline for a buffer (allocEmptyBuf). The source object 901 is blocked until there is sufficient memory. This means that the pipeline is self-regulating; it has automatic flow control. ('389 patent, 8:45-49)

(See Villasenor Declaration, ¶ 32.)

In fact, Thomason teaches away from controlling the flow of data between buffers 4 and buffer memory 35. Thomason describes the movement of data from buffers 4 to buffer memory 35 with the assistance of DMA controller 31 in passive terms, e.g.: “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.*” (Thomason, 4:43-47, emphasis added). There is no teaching in Thomason that a transform object interacts with a source object involved in the flow of data into buffer 35a in any way when main memory 36 “may be temporarily busy for another operation.”

In summary, Thomason cannot be read to disclose the claimed feature of “wherein said source object is automatically flow controlled by said transform object.”

Krause is not cited for and does not teach or suggest "flow control" in the context of either Thomason's teaching or of claims 31 and 61. Krause cannot be relied on to provide the teaching missing from Thomason that the "source object is automatically flow controlled by said transform object." Therefore, Thomason and Krause, whether considered separately or in any rational combination, fail to disclose or suggest that the "source object is automatically flow controlled by said transform object" as recited in claims 31 and 61.

C. "Sink Object"

The Office Action states that the "claimed 'sink object' relates to transferring data streams from buffer memory where a 'sink' simply consumes data from a buffer." (Office Action, p. 8 referring to claim 31; Office Action, p. 16 referring to claim 61.) The text from the '389 patent cited in the Office Action in support of this interpretation states that "sinks 803 consume buffers of data." ('389 patent, 7:50.) While this text describes an action taken by the sink object, the sink object acts, and is acted on, in the system in other ways as well, as shown in the following excerpts from claim 31:

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;

('389 patent, 15:3-9.)

Similarly, claim 61 recites:

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;

(‘389 patent, 18:19-25.)

See also ‘389 patent, 8:52-59.

It is clear that the "sink object" as disclosed and claimed in the ‘389 patent does much more than the limited function suggested by the Office Action. Thus the interpretation of "sink object" presented in the Office Action is improper. (*See Villasenor Declaration*, ¶ 36.)

D. Thomason does not disclose a "sink object" as claimed.

As discussed above, both claims 31 and 61 specifically require that the "sink object is automatically flow controlled by said transform object." This claim element requires that the transform object act to carry out flow control of the sink object. Thomason fails to disclose the element of "wherein said sink object is automatically flow controlled by said transform object" recited in claims 31 and 61 of the ‘389 patent.

The Office Action alleges that the operation of DMA controller 33 and microprocessor 24 in Thomason is the "sink object" recited in claims 31 and 61.

Specifically, the Office Action states:

[T]he 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.

(Office Action, p. 8., referring to claim 31; Office Action, p. 15, referring to claim 61.)

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)*

(Office Action, page 9, referring to claim 31; Office Action, page 16, referring to claim 61; parentheses in original).

As discussed above, the Office Action alleges that the operation of DMA controller 32 as supervised by microprocessor 24 in Thomason is the “transform object” recited in claims 31 and 61. Specifically, the Office Action states:

[T]he operation of DMA controller 32 as supervised by microprocessor 24 - i.e., the transform object . . .

(Office Action, page 7, referring to claim 31; Office Action, pages 14-15, referring to claim 61.)

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.

(Office Action, page 8, referring to claim 31; Office Action, page 15, referring to claim 61.)

In discussing the claim element “wherein said sink object is automatically flow controlled by said transform object,” the Office Action states:

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)

(Office Action, page 9, referring to claim 31; Office Action, page 16, referring to claim 61; parentheses in original).

The cited Thomason text from col. 4, lines 52-61 in turn states:

*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.

(Thomason, 4:52-61, emphasis added)

Nowhere does Thomason disclose or suggest the control of data from the "output data" side of buffer 35 into buffers 14 as argued in the Office Action. (See Villasenor Dec. 23). In contrast, the design in Thomason is explicitly aimed at a system in which there is no flow control into buffer 35 from buffers 14. (See Villasenor Declaration, ¶ 38.)

The claim element

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

requires that the transform object act to carry out flow control of the sink object. Nothing in the Thomason text at 4:52-61 or in Thomason generally teaches or suggests that "the operation of DMA controller 33 and the microprocessor 24" - the elements of Thomason that the Office Action has identified as the sink object - is automatically flow controlled by "[t]he operation of DMA controller 32 as supervised by microprocessor 24" - the elements of Thomason that the office action has identified as the transform object.

The portion of Thomason cited in the Office Action as showing the "wherein said sink object is automatically flow controlled by said transform object" claim element as it allegedly relates to the main memory ("until the main memory is available to output data") pertains to operations of Thomason occurring upstream of, and before, the transfer of data from buffer 35 to buffer 14. The action of DMA controller 33 in transferring data from buffer 35 to buffer 14, or the action of microprocessor 24 in instructing DMA controller 33 to perform this transfer, do not constitute "automatic flow control" of the playback data pipeline. (See Villasenor Declaration, ¶ 38)

By contrast, the '389 patent describes automatic flow control involving the need for the sink object to obtain a buffer from the (upstream) transform object:

The sink 903 is flow controlled as well. It calls nextFullBuf which tells the transform 902 that it is ready for the next filled buffer. This operation can block the sink 903 until a buffer is ready. When the sink 903 is finished with a buffer (i.e., it has consumed the data in the buffer) it calls releaseEmptyBuf. ReleaseEmptyBuf gives the buffer back to the transform 902. The transform 902 can then hand that buffer, for example, back to the source object 901 to fill up again. In addition to the automatic flow-control benefit of this method, it also provides for limiting the amount of memory dedicated to buffers by allowing enforcement of a fixed allocation of buffers by a transform. This is an important feature in achieving a cost-effective limited DRAM environment. ('389 patent, 8:52-65)

A person of ordinary skill in the art would not conclude that the “sink object” (microprocessor 24 and DMA controller 33) as identified in the Office Action is “automatically flow controlled by said transform object,” as required by claims 31 and 61. To the contrary, Thomason teaches away from this, as it describes the movement of data from the output side of buffer 35 to buffer 14 with the assistance of DMA controller 33 in passive terms (e.g. “[a]n adequate supply of data per channel must always be present in the buffer memory 35 to be able to keep up with the demand;” *see* Thomason, 4:13-15) as explained earlier. (*See* Villasenor Declaration, ¶ 40.)

Krause does not teach or suggest “flow control” in the context of either Thomason's teaching or of claims 31 and 61. Krause cannot be relied on to provide the teaching missing from Thomason that the “sink object is automatically flow controlled by said transform object.” Therefore, Thomason and Krause, whether considered separately or in any rational combination, fail to disclose or suggest that the “sink object is automatically flow controlled by said transform object” as recited in claims 31 and 61. (*See* Villasenor Declaration, ¶ 41.)

E. The combination proposed in the office action adds nothing of value to Thomason.

The Office Action argues that:

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. (Office Action, pages 4-5, referring to claim 31; Office Action, page 12, referring to claim 61.)

The Office Action then argues that one of ordinary skill in the art would have been motivated to combine Krause with Thomason.

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 MPEGformatted 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. (Office Action, pages 10-11, referring to claim 31; Office Action, page 12, referring to claim 61..)

Even before discussing the problems inherent with the system disclosed by Thomason, TiVo completely disagrees with the Office Action's contention. Assuming, *solely* for the sake of argument, that Thomason discloses a functional system, modifying Thomason as proposed by the Office Action would not change the operation of Thomason. Even if an I-frame detector as disclosed in Krause were inserted prior to buffers 4 in Thomason, as proposed in the Office Action, this change would not result in a functional system that would operate any differently than Thomason without the addition of the I-frame detector. "Knowing the locations of I-frames in advance" (as stated in the Office Action) would not "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" (Office Action). Thomason's acceleration controller 41 only operates on combined *analog* audio/video signals. An I-frame detector only works with *digital* signals. Krause's *digital* signal I-frame detector would have no effect on the operation of Thomason's *analog* acceleration controller 41, as that component is described in Thomason.

Furthermore, the combination proposed in the Office Action would significantly change the principle of operation of Thomason. The extent of this change is highlighted by considering (a) the inherent defects in the Thomason disclosure, and (b) the full set of modifications that would need to be made to Thomason to realize this proposed combination. (See Villasenor Declaration, ¶ 43.)

The Office Action contends that "[o]ne of ordinary skill in the art would employ the indexing of 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.” (Office Action, p. 11.) The Office Action additionally contends that “[k]nowing the locations of 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.”

In order to make the changes proposed in the Office Action, one would also need to address a fundamental problem associated with the acceleration controller 41 in Thomason. Acceleration controller 41 allegedly provides for fast forward and reverse functions:

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.

(Thomason, 4:19-23, emphasis added.)

FIG. 1 of Thomason does not contain any provision for enabling the “user command signals” emanating from boxes 25 and 26 of FIG. 1 to be provided to the acceleration controller. There is nothing in Figure 1 or in the Thomason specification that shows any functional connection between the user interface 26/user command ports 25 and the acceleration controller 41. It is important to note that the acceleration controller is located *downstream of both* the data decompressor 13 and the d/a converter 12. The only input to the acceleration controller is an *analog video/audio composite signal*. This assumes that the unlabeled line with no arrow to indicate direction of data flow between d/a converter 12 and acceleration controller 41 consists of an input to controller 41 from converter 12; otherwise acceleration controller 41 would have no input at all. In a system constructed in accordance with Thomason, the acceleration

controller would be unable to perform the stated functions of providing for fast forward and fast reverse because it lacks the ability to receive and therefore act on (a) digital signals to provide fast forward and/or fast reverse; and (b) signals generated as a result of user commands. These are defects that the addition of I-frame location information collected prior to buffers 4 could not remedy, as there would be no useful way to provide that information (which pertains to the location of digital information in a compressed video representation) to acceleration controller 41, a system element capable of receiving only uncompressed analog video. There would also be similar problems in providing user command signals related to "slow motion and frozen frames and frame stepping" (Thomason, 4:21-22) to the acceleration controller 41. (*See* Villasenor Declaration, ¶ 45.)

Even if an I-frame detector as disclosed in Krause were inserted prior to buffers 4 in Thomason, as proposed in the Office Action, this change would not result in a functional system. (*See* Villasenor Declaration, ¶ 46.)

To obtain a functional system combining Krause and Thomason that would, as proposed in the Office Action, "identify I-frames from other video and audio data prior to storage in buffer 4", to thereby "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" (Office Action, p. 11), one would, in addition to inserting a block to identify I-frames prior to buffer 4 as set forth in the Office Action, have to make the following additional changes to Thomason:

- 1) add a new acceleration controller connected to the bus (since the original acceleration controller 41 is unable to perform its stated functions as described above),
- 2) add a mechanism to store the identified I-frame location information and provide it as appropriate to the new acceleration controller,
- 3) remove or modify the original acceleration controller 41 to avoid conflicts with the new acceleration controller, and
- 4) modify the operations of the microprocessor, DMAs, buffer management, and user command handling to enable the I-frame location information to be used to carry out "operations such as varying speed reverse or varying speed forward" (as stated in the Office Action). (See Villasenor Declaration, ¶ 47.)

These changes would result in a new system, one very different from the apparatus disclosed by Thomason. This hypothetical apparatus would operate in a very different manner from that taught by Thomason. The principle of operation disclosed by Thomason would be fundamentally altered such that Thomason would no longer operate as described. Significantly, one would have to remove or substantially modify the analog video acceleration controller 41, which is a key element in Thomason's apparatus and method of operation, to enable it to operate on digital signals. A combination requiring such fundamental changes to the apparatus and method of operation disclosed by Thomason would not and could not have been obvious to one of ordinary skill in the art. (See Villasenor Declaration, ¶ 48.)

"If 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 VI* See also *Application of Ratti*, 270 F.2d 810, 813 (CCPA 1959) (The suggested combination of references would require a substantial reconstruction and redesign of the elements shown in the reference as well as a change in the basic principles under which the reference construction was designed to operate); also *Ex Parte William B. Greenwald and Richard C. Evans*, 2009 WL 1899597 *3 (Bd.Pat.App. & Interf.) ("[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007). Modifying Brock's structure to meet the claim limitations would have required more than the mere substitution of a retention aperture for Brock's raised portion 263, however."). While it may be that once the inventor has taught how the changes could be made, the redesign, in hindsight, may seem obvious, the references must be viewed as of the time the invention was made, without the benefit of the inventive teachings. It is too well settled for citation that the blueprint laid out in the '389 patent cannot be relied on in hindsight to reconstruct Thomason so that it would then operate in the manner proposed by the Office Action.

For at least these reasons, it would not have been obvious to a person of ordinary skill, relying only on the teachings of Thomason and Krause, to make the modifications proposed in the Office Action. To achieve a workable modification of Thomason in view of Krause would require substantial non-obvious hindsight modifications that

would result in a device having a fundamentally different principle of operation from that of Thomason.

For all of the foregoing reasons, the invention of claims 31 and 61 would not have been obvious to one of ordinary skill from the teachings of Thomason and Krause.

V. *Objections to Office Action Summary of '389 Patent*

The Office Action interprets a number of terms used in the specification and/or claims of the '389 patent. TiVo believes that these interpretations do not follow the rule of "broadest reasonable interpretation" as required by *e.g.*, *In re Prater*, 415 F.2d 1393, 1404 (CCPA, 1969); *see also* MPEP §2111.

By way of example, but not exhaustion, the Office Action interprets "parsing" as follows:

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)

Office Action, p. 4.

This interpretation of parsing is overly narrow, and does not recognize, for example, embodiments that use a parser to distinguish between the different types of data (video, audio, etc.) or to perform other forms of analysis.

There are numerous additional interpretations contained in the Office Action with which TiVo disagrees. However, the exact interpretation of these elements is not necessary to distinguish claims 31 and 61 over the combination of Thomason and Krause. Therefore, to conserve resources, TiVo will not highlight these disagreements at this time.

VI. Secondary Considerations

Prior to the invention described in the '389 patent, the entertainment industry was desperately searching for a commercial product to provide interactive television to consumers. Articles written around the time of the introduction of TiVo's first commercial digital video recorder (DVR) product recognized this long felt need in the entertainment industry and how other companies, including major cable companies, tried to meet the need and failed. (*See* Barton Declaration, ¶ 3.)²

Many early interactive television products and systems, such as the Time Warner Full Service Network, failed due to their cost and complexity. The invention described in the '389 patent was intended to (and in fact did) deliver much of the promise of interactive TV but without the complexity and cost of prior failed solutions. (*See* Barton Declaration, ¶ 4.)

All of TiVo's commercial DVR products include the features recited in claims 31 and 61. Namely, TiVo's products provide users with the ability to simultaneously record and play back live TV broadcast as well as to reverse, fast forward, and pause live television, all in a cost-effective system. The commercial success of TiVo's DVR products is due primarily, if not exclusively, to the delivery to consumers of these components of interactive television at a commercially reasonable price point. (*See* Barton Declaration, ¶ 7.)

TiVo released its first commercial DVR device in early 1999. For the next seven years, through 2006, TiVo experienced steady and consistent growth of its DVR subscriber base. As of the fourth quarter 1999, TiVo had approximately 10,000

² References to "Barton Declaration" are to specific paragraphs of the Declaration of James M. Barton, submitted herewith as Appendix B.

subscribers. By 2002, TiVo had passed the 500,000 subscriber mark. And by 2006, TiVo had over 4.4 million subscribers. (See Barton Declaration, ¶ 8.)

The commercial success of the TiVo DVR is highlighted by the numerous awards and industry accolades received by the product since its introduction. (See Barton Declaration, ¶ 9.) The United States PTO Museum recognized the importance of the TiVo DVR product by selecting it for inclusion in the exhibit entitled “The Invention Machine: A Day in My Life” which celebrates the country’s most influential inventions. The exhibit highlighted the benefits of the ‘389 patent which covers TiVo’s proprietary technology for efficiently storing and playing back TV shows. (See Barton Declaration, ¶ 10.)

Commentators have also recognized that the commercial success of the TiVo DVR product introduced a dramatic paradigm shift in the way people watch television. (See Barton Declaration, ¶ 11.)

The TiVo DVR embodying the features recited in claims 31 and 61 has become a fixture in American consumer culture. The TiVo DVR has been prominently mentioned in various television shows, including *The Simpsons* and *Family Guy*, among many others. The TiVo DVR has also been included as a question in the 20th Anniversary edition of Trivial Pursuit and in the New York Times crossword puzzle. (See Barton Declaration, ¶ 12.) Additionally, TiVo now has or has had agreements with major communications and equipment providers, both domestically and internationally, to make or distribute commercial DVR products. (See Barton Declaration, ¶ 13.)

As early as 2002, commentators recognized that TiVo's successful efforts led competitors "to throw their knockoffs into the market that TiVo spent so dearly to create." (*See* Barton Declaration, ¶ 14.)

In January, 2004, TiVo sued EchoStar for infringement of the '389 patent. In April 2006, a jury found that EchoStar had willfully infringed the '389 patent (including claims 31 and 61). The District Court entered an injunction which barred future infringement and required EchoStar to disable DVR functions of specified satellite receivers that EchoStar had wrongfully placed in consumers' homes. The Federal Circuit upheld the jury verdict of infringement of claims 31 and 61.

As found by the District Court in a subsequent contempt hearing³, EchoStar has continued to infringe claims 31 and 61 of the '389 patent by providing DVR products and services that incorporate the features of claims 31 and 61. EchoStar has diverted (and continues to divert) subscribers to EchoStar that are in TiVo's target market. This has reduced the number of subscribers in the DVR market available to TiVo and has caused TiVo a loss of market share and business opportunity. EchoStar has been able to build and increase its subscriber base because DVR subscribers typically do not switch DVR providers,. (*See* Barton Declaration, ¶ 16.)

In 2006, the DVR market was in a period of rapid growth and development. When the jury returned its verdict in favor of TiVo in April 2006, TiVo had well over 4 million subscribers. That was still true when the district court issued its injunction in September 2006. Since the stay of the injunction in the fall of 2006, however, the number of TiVo subscribers has dropped significantly every quarter, for an overall loss

³ See Section VII, *infra*.

of over a million subscribers to date. At the same time, EchoStar has gained DVR subscribers every quarter, and it has gone from fewer DVR subscribers than TiVo to twice as many DVR subscribers as TiVo. (*See* Barton Declaration, ¶ 17.)

Since 2006, TiVo has lost over a half million subscribers and EchoStar has gained over two million new subscribers. In the first quarter of 2006, EchoStar had approximately 3.6 million DVR subscribers, while TiVo had approximately 4.4 million. By the fourth quarter of 2008, EchoStar had nearly doubled its number of subscribers to 6.6 million, while TiVo's subscriber base had declined to just over 3.3 million – a drop of nearly 25%. (*See* Barton Declaration, ¶ 18.)

It is clear from the foregoing that the invention described and claimed in the '389 patent, with specific reference to claims 31 and 61, has been a great commercial success. That success was almost immediate following its introduction into the marketplace. This success has been sustained for the past 10 years. Had not EchoStar's infringing products been available, TiVo would have had greater growth. Nearly all of EchoStar's customer base would likely have become subscribers of TiVo. The fact alone that EchoStar chose to infringe the '389 patent is evidence that the invention embodied in the '389 patent, and in claims 31 and 61, in particular, is a commercially successful invention.

VII. Related Proceedings

Claims 1-61 of the '389 patent are the subject of pending litigation in the United States District Court for the Eastern District of Texas, Marshall Division, *TiVo, Inc. v. Echostar Communications Corp., et al.*, Case No. 2-04CV-01. A jury verdict finding infringement by Echostar was entered on April 13, 2006. The District Court entered an order for a permanent injunction, which the Court of Appeals for the Federal Circuit

stayed pending appeal. The Federal Circuit affirmed the claim construction of disputed terms in claims 31 and 61, the finding of infringement and the damages award, and dissolved the stay of the permanent injunction on January 31, 2008 (516 F.3d 1290). The matter is currently again before the Federal Circuit following a holding by the District Court that EchoStar was in contempt of an injunction issued by the District Court, which was not challenged on the first appeal.

The '389 patent is also the subject of the following pending litigation in the United States District Court for the Eastern District of Texas, Marshall Division:

- 1) TiVo Inc. v. Verizon Communications, Inc. Case No. 2:09CV00257
- 2) TiVo Inc. v. AT&T Inc., Case No. 2:09CV00259

No substantive actions have as yet been taken in these two new litigations.

The '389 patent was also previously asserted in an additional litigation in the United States District Court for the Northern California (San Francisco), TiVo, Inc. v. Sonicblue, Inc., Case No. 3:02cv365, filed on January 23, 2002. The parties stipulated to dismiss the case without prejudice.

VIII. Other Matters

A. The Request for Reexamination failed to raise a substantial new question of patentability

The current Request for Ex Parte Reexamination filed November 10, 2008, by Dish Network Corporation, formerly EchoStar Communications Corporation, failed to raise a substantial new question of patentability⁴.

⁴ For ease of discussion, both Dish Network Corporation and EchoStar Communications Corporation are referred to herein as "EchoStar."

The reexamination statute allows for the grant of a reexamination only when the request establishes a *substantial* new question of patentability ("SNQ"). 35 U.S.C. §§ 302-303. To establish an SNQ, a reexamination request must demonstrate that the proposed question of patentability is different from and non-cumulative to questions raised in previous examinations. MPEP § 2216. Additionally, when the request relies on a previously considered reference, the request must include evidence that the previously considered reference is being presented in a "new light." That is, the request must present *substantial evidence* that the previous Examiner did not properly understand the reference or did not consider a portion of the reference in making the prior decision on patentability. H.R. Rep. 107-120, p. 3.

On October 17, 2005, EchoStar filed a first reexamination request (the "First Request") against the '389 patent. The First Request sought reexamination of claims 1, 6, 20, 21, 23, 32, 27, 51, and 52. Reexamination was ordered by the Office on December 15, 2005 (See Reexamination Control No. 90/007,750). In its Order Granting Request for *Ex Parte* Reexamination ("the First Order"), the Examiner *sua sponte* examined all claims, including claims 31 and 61. The Examiner expressly stated that "**All claims will be reexamined.**" (See First Order, p. 12.) As part of the first reexamination proceeding, the Examiner evaluated all claims against the references of record, which, as discussed below, included the references at issue in the Second Request.

Shortly after the Office issued a Notice of Intent to Issue a Reexamination Certificate in the First Reexamination confirming the patentability of all claims of the '389 patent, EchoStar filed this Second Request for reexamination of the '389 patent, presenting U.S. Patent No. 6,018,612 to Thomason ("Thomason") and U.S. Patent No.

5,949,948 to Krause ("Krause") as allegedly raising substantial new questions of patentability. ***Both Thomason and Krause were considered during the first reexamination.*** To support its use of Thomason and Krause, EchoStar included a broad conclusory statement - "The [first] request did not seek reexamination of software claims 31 and 61, nor did it raise any question of patentability based on Thomason alone or Thomason with Krause as to any claims." (Second Request, p. 5.) EchoStar presented no evidence (or even attorney argument) as to how Thomason and Krause are now being applied in a new light as compared to their application in the first reexamination, as is required by 35 U.S.C. §303 and MPEP §2261.

EchoStar's current Request for reexamination was based solely on two references that were considered in the first reexamination. EchoStar, however, failed to meet its burden of showing how the question of patentability raised in the second request was different from and non-cumulative to those raised in the first reexamination of the '389 patent. Additionally, EchoStar failed to provide any evidence, let alone meet its burden of providing ***substantial*** evidence that the Examiners in the first reexamination proceedings did not properly understand the previously considered references presented in the second request. By granting the Second Request, which lacked a showing of a substantial new question of patentability, the United States Patent and Trademark Office ("the Office") took an action that negated the protections guaranteed to TiVo under 35 U.S.C. § 303. As such, the Order granting the Second Request for Reexamination was *ultra vires* and should be vacated.

B. Congress Enacted the Substantial New Question Provision of Section 303 to Prevent Harassment of a Patent Owner

The *ex parte* reexamination statute (Public Law 96-517) was "part of a larger effort to revive United States industry's competitive vitality by restoring confidence in the validity of patents issued by the PTO." *Patlex v. Mossinghoff*, 758 F.2d 594, 601 (Fed. Cir. 1985). Such confidence, however, cannot be restored by permitting seriatim reexaminations that place a cloud over a patent for significant portions of its life without strictly imposed limitations. Congress, as a result, ensured that the rights of patentees are protected during reexamination proceedings. "As part of the original 1980 reexamination statute, Congress struck a balance between curing allegedly defective patents and preventing the harassment of patentees. It adopted a standard requiring a request for reexamination to raise a 'substantial new question of patentability.'" *See* H.R. Rep. No. 107-120, at 1; *See also In re Recreative Technologies*, 83 F.3d 1394, 1397 (Fed. Cir. 1996). Congress thus enacted 35 U.S.C. § 303 requiring the Commissioner to "determine whether a substantial new question of patentability affecting any claim of the patent concerned is raised by the request." This provision was intended to limit reexamination only to "new information about pre-existing technology which may have escaped review at the time of the initial examination of the application." *See* H.R. Rep. No. 96-1307, 96th Cong., 2d Sess. 3 (1980).

The legislative record makes it abundantly clear that an important purpose of 35 U.S.C. § 303 is the protection of the patent owner:

[The statute] carefully protects patent owners from reexamination proceedings brought for harassment or spite. The possibility of harassing patent holders is a classic criticism of some foreign reexamination systems and we made sure it would not happen here.

Comments by then PTO Commissioner Diamond, *Industrial Innovation & Patent & Copyright Law Amendments: Hearings on H.R. 6933, 6934, 3806, & 214 Before the Subcomm. On Courts, Civil Liberties and the Administration of Justice of the House Comm. On the Judiciary*, 96th Cong., 2d Sess. 594 (1980).

This "substantial new question" requirement would protect patentees from having to respond to, or participate in unjustified reexaminations.

Report by Congressman Kastenmeier, H.R. Rep. No. 1307 (part I), 96th Cong., 2d Sess. 7 (1980).

Because of the ... safeguards in the proposed reexamination procedure, it is unlikely that there will be any substantial amount of harassment ... The Commissioner must find that "a new question of patentability" has been created ... before ordering a reexamination.

Comments by Robert Benson on behalf of the American Bar Association, *Patent and Trademark Law Amendments of 1980: Hearings on H.R. 6933 Before the Subcomm. Of the House Comm. On Government Operations*, 96th Cong., 2d Sess. 178 (1980).

In light of a perceived overly strict interpretation by the Federal Circuit, Congress amended § 303 in 2002 to state that "[t]he existence of a substantial new question of patentability is not precluded by the fact that a patent or printed publication was previously cited by or to the Office or considered by the Office." H.R. Rep. No. 107-120, at 2, 7. Nevertheless, this amendment was not in any way intended to remove the "substantial new question" standard. In fact, Congress stressed that "[w]hile this bill clarifies the basis for a reexamination determination and removes the overly-strict bar established by the court, which renders the available process useless in many obvious instances such as with previously considered prior art, the courts should judiciously interpret the 'substantial new question' standard to prevent cases of abusive tactics and

harassment of patentees through reexamination." *Id.*, at 3. Congress further cautioned that the 2002 bill was "not a license to abuse patentees and waste the life of a patent." *Id.*, at 3. The "substantial new question" standard must continue to be strictly enforced, especially when considering art that was already of record in prior examinations.

C. *The Manual of Patent Examining Procedures (MPEP) Requires that a Third Party Requester Show How a "Substantial New Question" Raised in a Request Is Substantially Different From Those Raised in Prior Examination.*

The Manual of Patent Examining Procedures (MPEP) describes the procedures for the PTO determination of whether a "substantial new question of patentability" has been raised. *See MPEP §2216.* Specifically, MPEP §2216 requires that the reexamination request "**must** point out how any questions of patentability raised are **substantially** different from those raised in the previous examination of the patent before the Office." *MPEP §2216.* (emphasis added). *Any* difference is not sufficient. The differences must be **substantial**. MPEP §2216 further requires that

"[i]t must first be demonstrated that a patent or printed publication that is relied upon in a proposed rejection **presents a new, non-cumulative technological teaching** that was not previously considered and discussed on the record during the prosecution of the application that resulted in the patent for which reexamination is requested, and during the prosecution of any other prior proceeding involving the patent for which reexamination is requested." *Id.* (Emphasis added.)

Thus, MPEP § 2216 places the burden on the third party requester to demonstrate that the questions of patentability raised are **substantially** different than those raised in previous examinations. This procedure is consistent with the legislative history:

The party requesting the reexamination would **have the burden** of convincing the Commissioner of Patents that a new question of patentability has been raised ...

Comments by Robert Benson on behalf of the American Bar Association, *Patent and Trademark Law Amendments of 1980: Hearings on H.R. 6933 Before the Subcomm. Of the House Comm. On Government Operations*, 96th Cong., 2d Sess. 178 (1980)(emphasis added). This burden cannot and should not be shifted to the patentee.

D. The Patent Office Shifted the Burden to TiVo.

In granting EchoStar's second reexamination request, the Office placed the sole emphasis of the SNQ on the question of whether a reference was cited or considered in a prior examination. No consideration was given to whether the technical teaching of the reference relied upon in the request was previously considered. Such an approach - divorcing the content or technical teaching of a reference from the SNQ analysis - is improper and eviscerates the limited protection that the SNQ affords the patent owner.

The 2002 House of Representatives Report on Substantial New Question of Patentability in Reexamination Proceedings acknowledged that the "agency has discretion in this determination to permit reexamination, ***but it is not absolute.***" *Id.*, at 3. (emphasis added.) The action by the Office of granting the second reexamination request based only on a conclusory statement by the third party requester has the effect of shifting the burden of proof to the Patent Owner, the party that 35 U.S.C. § 303 was specifically designed to protect. Thus, the Office's action negated the limited protections that Congress sought to provide to a Patent Owner.

When a reference being presented in a reexamination request was previously considered by the Office in a prior examination, as is the case in the present reexamination, the request must first establish that the technological teaching of the reference being relied upon is presented in a new light. However, the inquiry cannot end

there. Even if a reference was never considered or is being presented in a new light, the request must present substantial evidence that the technological teaching of the reference is not cumulative to technological teachings considered in a previous examination.

In the Second Request for Reexamination of the '389 patent, EchoStar failed to meet its burden of demonstrating how the questions of patentability raised in this reexamination request differed substantially from those raised in previous examinations. The Order granting a reexamination request in which EchoStar failed to produce any evidence to support its contention that a new question of patentability, *substantially different from and non-cumulative to* those raised in previous examinations, exists, is an *ultra vires* act. Accordingly, the grant of the present reexamination must be vacated.

E. EchoStar Failed to Meet Its Burden of Presenting Substantial Evidence that Examiner Harvey and Examiner Escalante Did Not Properly Consider or Understand Thomason and Krause.

When enacting the 2002 Amendments to 35 U.S.C. § 303, Congress intended to set a high evidentiary burden on a third party requester seeking reexamination based on an old reference:

The point must be stressed that the past requirement of a "substantial new question of patentability" has not been diminished. The issue raised must be more than just questioning the judgment of the examiner. There should be *substantial evidence that the examiner did not properly understand the reference, or did not consider a portion of the reference in making his decision*. That substantial new question must be put forward clearly in the request for examination.

H.R. Rep. No. 107-120, at 3. (emphasis added).

EchoStar presented no evidence (or even attorney argument) as to how Thomason or Krause is different from the other references considered by the Examiners in the first reexamination request, and similarly provided no evidence (or even attorney argument)

as to how Thomason or Krause is non-cumulative to those references. EchoStar's broad, conclusory, self-serving statement, is no substitute for evidence. EchoStar plainly failed to meet its burden of showing, on the face of its reexamination request, a substantial new question of patentability.

A second reexamination cannot be based on a request as devoid of evidence as EchoStar's Second Request, especially where it is clear that EchoStar's primary, if not only, goal is to harass TiVo. The '389 patent underwent a first reexamination lasting approximately three years. During that time, the party requesting the reexamination (EchoStar) unsuccessfully challenged, *inter alia*, the validity of claims 31 and 61 of the '389 patent in federal district court, and did not appeal the district court's ruling upholding the validity of claims 31 and 61 to the Federal Circuit. The present reexamination was requested by the same party (EchoStar) at the conclusion of the first reexamination and has the likelihood of lasting another three to five years or more, if appealed. The combined duration of the reexaminations amounts to placing a cloud over TiVo's property right for almost half of its period of enforceability. This legal strategy designed to waste the life of TiVo's property right is the exact situation that Congress sought to prevent by enacting 35 U.S.C. § 303.

EchoStar based its Second Request solely on the Thomason and Krause patents. Thomason and Krause, were considered by both Primary Examiner Harvey and Primary Examiner Escalante of the CRU, and by their respective conferees, during the first reexamination proceeding. EchoStar was required to meet the increased burden of providing substantial evidence that both of these seasoned Examiners and their conferees did not properly understand Thomason and Krause. EchoStar failed to meet this burden.

Instead, EchoStar merely stated that "in the co-pending reexamination, Thomason (or its combination with Krause) was not used to reject any claims or even discussed on the record." (Second Request, p. 5.) Thus, EchoStar appears to argue that the application of Thomason and Krause in a proposed rejection that was not made in the prior examination is a sufficient basis for a substantial new question of patentability. However, this argument goes simply to the manner of applying the technical teachings of Thomason and Krause in a rejection, which is a requirement separate from the substantial new question of patentability requirement. See 37 C.F.R. § 1.510(b). EchoStar failed to meet its burden of presenting any evidence, let alone substantial evidence, that the technological teachings of Thomason and Krause differ from the technological teachings of the applied references, or that this alleged new manner of application of Thomason and Krause was based on a misunderstanding of the technical teachings of the references by the prior Examiners.

As discussed in the legislative history of the 2002 amendment to § 303, the context of a prior consideration of a reference is critical when determining whether a request includes a substantial new question of patentability. In the Second Request, EchoStar acknowledged that Thomason was included in an Information Disclosure Statement filed in March 2006 by TiVo. Citing MPEP § 2258, EchoStar attempted to diminish the importance of this disclosure by arguing that because the statement "did not explain the content or relevance of any of the listed references" the scope of the Examiner's consideration should be limited. However, MPEP § 2258 states that limiting

the scope of consideration of a reference in an Information Disclosure Statement is only appropriate where there is no "indication to the contrary in the record."⁵

EchoStar failed to inform the Office in the Second Request that such an "indication to the contrary" did in fact exist in the first reexamination proceeding. Primary Examiner Harvey and Primary Examiner Escalante, both indicated that with respect to patent claims 31 and 61, "[t]he prior art of record does not show or suggest an object-based method/apparatus that is recited in claims 31 and 61." (Office Action in First Reexam, p. 19; *see also* Final Office Action in First Reexam, p. 22) Primary Examiners Harvey and Escalante therefore went beyond merely initialing a reference cited on an Information Disclosure Statement. They each affirmatively stated, in both the first and the final Office Actions in the First Reexam, that claims 31 and 61 were patentable over the references of record in the reexamination proceeding, including Thomason and Krause; and they each listed explicit features of claims 31 and 61 not present in those references. There is no requirement for examiners to do more, nor should there be.

Statements such as those made by Primary Examiners Harvey and Escalante when allowing claims over cited references must be taken objectively, at their face value: that they considered all portions of the cited references they said were considered, and that they determined that those references do not invalidate the claims for the expressly

⁵ 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. The initials of the examiner placed adjacent to the citations on the form PTO/SB/08A and 08B or its equivalent, *without an indication to the contrary in the record*, do not signify that the information has been considered by the examiner any further than to the extent noted above. MPEP § 2258. (emphasis added)

stated reasons. In other words, examiners should not be forced to discuss in detail every single cited reference by name. If the rule were otherwise, Office Actions would become unwieldy and the Office would quickly become overwhelmed. Examiners would be compelled to discuss in detail every single reference, lest they invite seriatim reexaminations on the references that were not discussed by name. Such a rule would be contrary to the statutory mandate that reexaminations be handled with "special dispatch." Here, Primary Examiners Harvey and Escalante did everything they were supposed to do: identify the references considered and provide an explicit statement as to what in the prior art of record – all of it, including Thomason and Krause – is missing from the patent claims. There was no reason for the Examiners to expressly list by name each of the references in the place of the phrase "prior art of record."

EchoStar admits that Krause was used as a basis for a substantial new question of patentability in the first reexamination request. (Second Request, p. 5.) Despite this admission, EchoStar fails to provide any discussion or evidence that Examiners Harvey and Escalante did not properly understand Krause when allowing claims 31 and 61 in the first reexamination proceeding or any discussion or evidence that Examiners Harvey and Escalante did not consider a portion of Krause when making their separate patentability determinations. EchoStar made no showing that Krause was presented in a new light.

The same is true with respect to Thomason. Because Examiners Harvey and Escalante considered Thomason in its entirety, EchoStar's burden in the reexamination was to present substantial evidence that Thomason is being presented in a new light and that Examiners Harvey and Escalante did not properly understand the technical teachings of Thomason. EchoStar failed to present such evidence. The discussion of Thomason in

the reexamination request therefore simply amounts to questioning the judgment of both Examiners, an argument that Congress explicitly stated was insufficient to support a substantial new question of patentability. A second reexamination, based on references that were already considered, should not be countenanced on such a sparse record.

Granting EchoStar's Second Request completely undermines the protections sought by Congress when enacting the substantial new question provision of Section 303. If the procedure followed by the Office here is allowed to stand, requesters can easily harass a patent owner by presenting reexamination request after reexamination request merely by altering the combination of "old references" presented in the rejection regardless of whether the previous Examiners fully understood and appreciated the technical teachings of each of the references. Accordingly, the Order granting EchoStar's Second Request was *ultra vires*, and must be vacated.

F. Any Office Procedure Allowing the Grant of a Reexamination Request Absent Substantial Evidence Is Contrary to the Statutory Mandate of 35 U.S.C. § 303, and Is, therefore, Void.

The Federal Circuit has expressly held that Office procedures which require the "PTO to resolve doubt in the direction of granting the request for reexamination are contrary to the statutory mandate of 35 U.S.C. § 303, and void." *Patlex Corp. v. Mossinghoff*, 771 F.2d 480, 487 (Fed. Cir. 1985). By not requiring substantial (or any) evidence that a presented alleged new question of patentability is different from and non-cumulative to issues raised in prior examinations and that an alleged new question of patentability using only previously considered references is based on a misunderstanding by the previous Examiners or is based on different portions of the previously considered references, the Office has instituted procedures that resolve doubt in the direction of

granting a request for reexamination. This is directly contrary to the Federal Circuit's express holding in *Patlex*.

In *Patlex*, 771 F.2d at 486, the plaintiff challenged §§ 2240 and 2244 of the MPEP that "require[d] the patent examiner, in implementation of 35 U.S.C. § 303, to resolve any doubt as to whether a substantial new question of patentability is raised in favor of granting the request for reexamination." For example, prior MPEP § 2240 stated: "Where doubts exist, all questions should be resolved in favor of granting the request for reexamination." *Id.*

The *Patlex* Court stressed that "Congress' major purpose in enacting § 303 was to protect patentees against doubtful reexaminations." *Id.* at 487. The Court further stated that "[w]hen Congress enacted 35 U.S.C. § 303 for the purpose of protecting the patentee, it could not have intended an implementation that would negate this protection. We can not endorse such a diversion of the statutory purpose." *Id.* The Court then held that "those portions of the MPEP which require the PTO to resolve doubt in the direction of granting the request for reexamination are contrary to the statutory mandate of 35 U.S.C. § 303, and void." *Id.*

In the present reexamination proceeding, the Office procedures allowed the grant of a reexamination request where a third party requester failed to produce any evidence that the proposed substantial new question of patentability was different from those raised in previous examinations of the patent before the Office and that the alleged new question of patentability, based solely on previously considered references, was being presented in a "new light." These procedures had the effect of resolving any doubt of whether a substantial new question of patentability existed in the request in favor of the

grant of a reexamination and shifted the burden to the Patent Owner to prove lack of substantial new question of patentability.

Accordingly, Office procedures allowing a requester to produce no evidence or to meet no evidentiary burden are contrary to the statutory mandate of 35 U.S.C. § 303, and are therefore void.

G. Summary

A driving purpose behind the original ex parte reexamination legislation was to reinforce confidence and certainty in the validity of patent rights. Under the current reexamination procedures, however, a patent can be subjected to multiple serial reexaminations until the patent term expires. Left unchecked, multiple serial reexaminations, and the resulting harassment of patent owners, would weaken, not reinforce, the certainty of patent rights. The intended gatekeeper against such harassing activity designed to waste the enforceable period of a patent is the "substantial new question of patentability" requirement. By not enforcing evidentiary burdens for establishing substantial new questions of patentability, particularly on serial reexamination requests, the Office is actually diminishing confidence in the certainty of patent rights. Precisely in situations such as this case, the "substantial new question" standard must be strictly enforced.

EchoStar failed to meet its evidentiary burdens for establishing a substantial new question of patentability in the request for reexamination. There is no such new question. Thus, the Order granting reexamination was an *ultra vires* action by the Office.

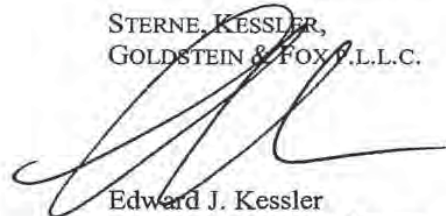
IX. Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. The Patent Owner therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. The Patent Owner believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present reexamination proceeding is in condition for a Notice of Intent to Issue a Reexamination Certificate. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,

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



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

Date: November 2, 2009

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Barton
Reexam of Pat. No. 6,233,389
Reexam Control No.: 90/009,329

Patent Under Reexamination: 6,233,389
Reexamination Control No.: 90/007,750
Examiner: David E. Harvey
Art Unit: 3992

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

Sir:

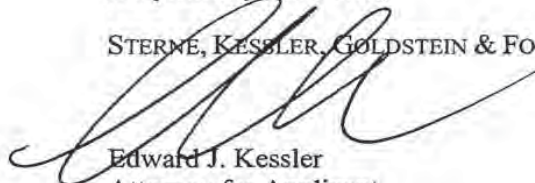
**CERTIFICATION OF SERVICE OF REPLY TO OFFICE ACTION AND
STATEMENT OF SUBSTANCE OF INTERVIEW**

In compliance with 37 C.F.R. § 1.550(f), the undersigned, on behalf of the patent owner, hereby certifies that a copy of this paper has been served on the third-party requester by first class mail on November 2, 2009. The name and address of the party served is as follows:

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

Respectfully submitted,

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



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APPENDIX A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re reexam of: U.S. Patent 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: FERRIS, Frederick

Atty. Docket: 2513.002REX0

Attn: Central Reexamination Unit

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Mail Stop: *Ex Parte* Reexamination

Declaration of John D. Villasenor Under 37 C.F.R. § 1.132

I, John D. Villasenor, declare as follows:

1. I have been retained as a technical expert on behalf of TiVo Inc. ("TiVo") for the above-captioned reexamination. I understand that this reexamination involves U.S. Patent No. 6,233,389 ("the '389 patent") which resulted from Application No. 09/126,071, filed on July 30, 1998 on behalf of James M. Barton, et al. I further understand that the '389 patent is currently assigned to TiVo.

2. I have reviewed the Office Action dated August 3, 2009 issued by the U.S. Patent and Trademark Office ("USPTO") for the '389 patent (the "Office Action"). I understand that only claims 31 and 61 of the '389 patent are subject to reexamination. Both Claims 31 and 61 are independent claims.

3. I have reviewed U.S. Patent No. 6,018,612 to Thomason, *et al.* (hereinafter "Thomason") and U.S. Patent No. 5,949,948 to Krause, *et al.* (hereinafter "Krause") which are the

two references applied in combination as the sole rejection of independent claims 31 and 61 under 35 U.S.C. § 103.

4. I am familiar with the provisions of 35 U.S.C. § 103(a), which states:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. I have been asked to provide my opinion regarding whether or not a person of ordinary skill in the art (this and all subsequent references to a “person of ordinary skill in the art” refer to the a person of ordinary skill in the art at the time the invention defined by claims 31 and 61 of the '389 patent was made) would understand the combination of Thomason and Krause to render claims 31 and 61 obvious. For the reasons set forth below, it is my opinion that a person of ordinary skill in the art would not have found claims 31 and 61 of the '389 patent to be obvious over Thomason in combination with Krause.

I. QUALIFICATIONS

6. I earned a Bachelor of Science degree in Electrical Engineering in 1985 from the University of Virginia and a Master of Science degree in Electrical Engineering degree in 1986 from Stanford University. I then earned a doctoral degree in Electrical Engineering from Stanford University in 1989. My doctoral studies concentrated on signal processing and communications.

7. I am currently a Professor in the Electrical Engineering Department of the University of California, Los Angeles. I have been on the UCLA Electrical Engineering faculty

since 1992. From 1997-2002, I held the position of Vice Chairman of the Electrical Engineering Department. Currently, I am involved in research to develop innovative, high-performance communications and computing technologies including projects relating to coding, image processing, sensor networks, and reliable high-speed communications. My research has been featured on the cover of *Scientific American* and in numerous technical journals.

8. Before joining the University of California, I was employed at the Jet Propulsion Laboratory from 1990-1992, where I developed new techniques for imaging the earth from space.

9. I am an inventor on approximately 19 issued U.S. Patents and have over 100 papers published in peer-reviewed journals and conference proceedings.

10. I am being compensated for my work on this declaration and my participation in the oral interview with the reexamination panel on September 22, 2009. My compensation is not dependent on the outcome of this reexamination.

II. My Understanding of Obviousness:

11. It is my understanding that a claimed invention is unpatentable if the differences between the claimed invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains.

12. It is my understanding that "obviousness" is a question of law based on underlying factual issues including the content of the prior art and the level of skill in the art. I understand that for a combination of references to render the claimed invention obvious, there must be some

reason why a person of ordinary skill in the art would have arrived at the claims by modifying, combining or other wise applying the teachings of the applied references.

13. I also understand that when considering the obviousness of a patent claim, one should consider whether a teaching, suggestion or motivation to combine the references exists so as to avoid impermissibly applying hindsight when considering the prior art. I understand this test should not be rigidly applied, but that the test can be important to avoiding such hindsight.

14. I also understand that if a modification or combination of references would change the principle of operation of the reference being modified, then the teachings of the references are not sufficient to render the claims obvious.

III. Independent Claims 31 and 61 of the '389 Patent

15. The '389 patent describes a multimedia time warping system that "gives the user the ability to simultaneously record and play back TV broadcast programs." (See '389 patent, 1:53-60.) Claims 31 and 61 of the '389 patent are subject to reexamination.

16. Independent claim 31 of the '389 patent recites:

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.

17. Independent claim 61 of the '389 patent recites:

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

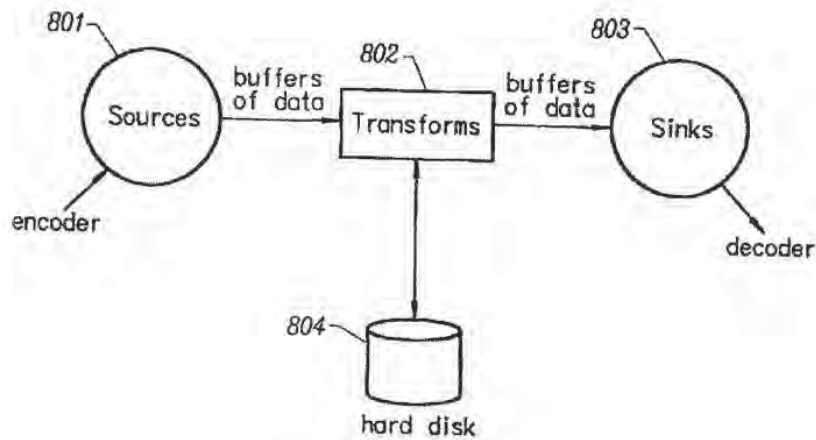
wherein said control object sends flow command events to said source, transform, and sink objects.

IV. CLAIMS 31 AND 61 ARE NOT OBVIOUS UNDER 35 U.S.C. § 103

18. In the Office Action, the Examiner rejected claims 31 and 61 under 35 U.S.C. § 103(a) as unpatentable over Thomason in view of Krause. (Office Action, p. 3.) In my opinion, neither of claims 31 and 61 would have been obvious to one of ordinary skill in the art in view of the combination of Thomason and Krause because the combination of Thomason and Krause fails to disclose or suggest at least the elements “*wherein said source object is automatically flow controlled by said transform object*” and “*wherein said sink object is automatically flow controlled by said transform object.*” Additionally, in my opinion, Krause could not be properly combined with Thomason because the addition of the elements of Krause to Thomason, as suggested in the Office Action, would change the principle of operation of Thomason.

A. Overview

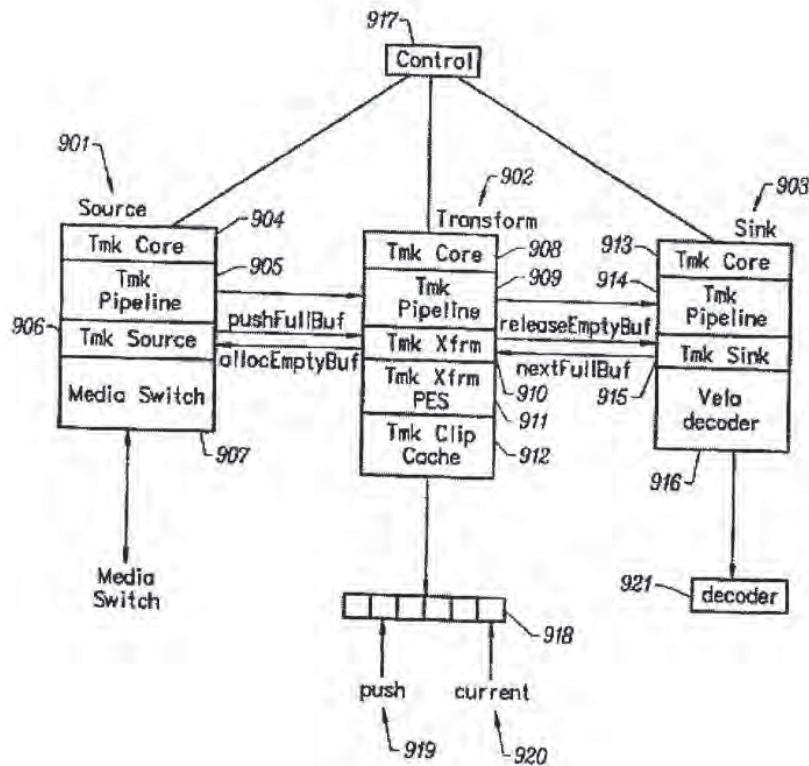
19. The role of buffers and automatic flow control with respect to the source, transform, and sink objects in the '389 patent is explained, for example, in FIGs. 8 and 9 of the '389 patent and the associated description in the specification. FIG. 8 of the '389 patent is reproduced below:



In the discussion of FIG. 8, the '389 patent explains that:

[a] transform is responsible for allocating and queuing the buffers of data on which it will operate. Buffers are allocated as if "empty" to sources of data, which give them back "full". The buffers are then queued and given to sinks as "full", and the sink will return the buffer "empty". ('389 patent, 7:52-57)

20. FIG. 9 from the '389 patent is reproduced below.



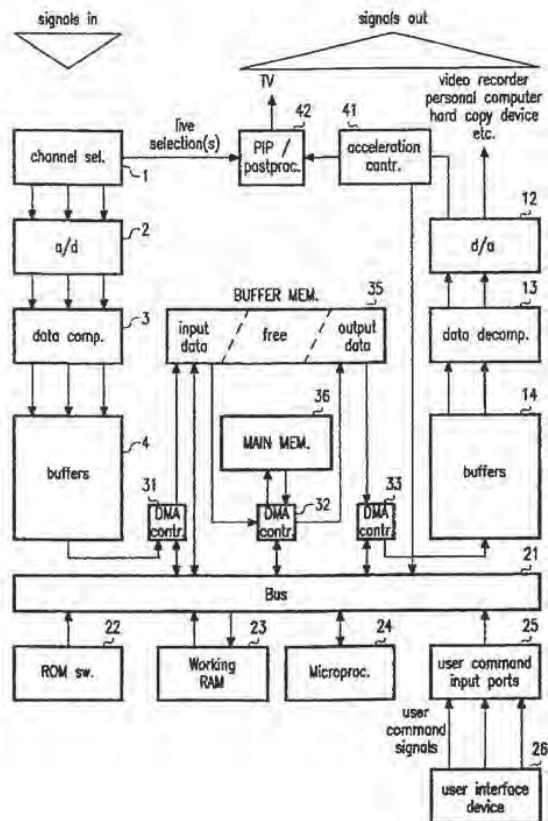
21. In describing the block diagram of the embodiment in this figure, the '389 patent explains that:

[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. To obtain the buffer, the source object 901 asks the down stream object in his pipeline for a buffer (allocEmptyBuf). The source object 901 is blocked until there is sufficient memory. This means that the pipeline is self-regulating; it has automatic flow control. When the source object 901 has filled up the buffer, it hands it back to the transform 902 through the pushFullBuf function.

The sink 903 is flow controlled as well. It calls nextFullBuf which tells the transform 902 that it is ready for the next filled buffer. This operation can block the sink 903 until a buffer is ready. When the sink 903 is finished with a buffer (i.e., it has consumed the data in the buffer) it calls releaseEmptyBuf. ReleaseEmptyBuf gives the buffer back to the transform 902. The transform 902 can then hand that buffer, for example, back to the source object 901 to fill up again. In addition to the automatic flow-control benefit of this method, it also

provides for limiting the amount of memory dedicated to buffers by allowing enforcement of a fixed allocation of buffers by a transform. This is an important feature in achieving a cost-effective limited DRAM environment. ('389 patent, 8:43-65)

22. Thomason fails to disclose or suggest “wherein said source object is automatically flow controlled by said transform object” and “wherein said sink object is automatically flow controlled by said transform object” as recited in claims 31 and 61. Thomason is directed at combining an input and output buffer memory into a single memory 35, as shown in Thomason figure 1:



23. There is no disclosure or suggestion in Thomason to control the flow of data from buffers 4 into the “input data” side of buffer 35. Similarly, there is no disclosure or suggestion in Thomason to control the flow of data from the “output data” side of buffer 35 to buffers 14. The design in Thomason is explicitly aimed at a system in which there is no flow control into buffer 35 from buffers 4, and from buffer 35 to buffers 14.

24. Instead, in Thomason the movements of data into the input side of buffer 35, and out of the output side of buffer 35, are described in passive terms. Thomason discloses that buffer 35 simply needs to be sufficiently large for these data movements to occur without any flow control:

Data arriving for storage in the main memory, while 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 program. 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. (Thomason, 2:41-51, emphasis added)

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. (Thomason, 4:13-15, emphasis added)

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. (Thomason, 4:43-51, emphasis added)

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. (Thomason, 4:62-65)

For this scheme to work properly, there must be adequate memory available in the buffer memory 35. (Thomason, 5:57-59)

B. The Office Action interpretation of “source object”

25. I disagree with the interpretation in the Office Action of the term “source object” recited in independent claims 31 and 61. The Office Action states:

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 patent at 8:43-45). (Office Action, p. 6 referring to claim 31; Office Action, p. 13, referring to claim 61)

Thomason discloses that the operation of DMA controller 31 under the supervision of microprocessor 24 - i.e., the source object . . . (Office Action, page 7 referring to claim 31; Office Action, p. 14, referring to claim 61)

26. In light of the disclosure and claims of the '389 patent, I believe that this is an improper interpretation of the term “source object”. The text from the '389 patent at 8:43-45 cited in the Office Action in support of this interpretation states that “[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.” ('389 patent, 8:43-45.) While this describes one of the actions that can be taken by the source object, the source object acts, and is acted on, in other ways as well, as shown in the following excerpts from claim 31:

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; ('389 patent, 14:59-15:2; emphasis added)

C. The combination of Thomason and Krause does not disclose or suggest “wherein said source object is automatically flow controlled by said transform object” as recited in claims 31 and 61 of the `389 patent

27. As noted above, the Office Action states that the operation of DMA controller 31 under supervision of microprocessor 24 in Thomason is the “source object” recited in claims 31 and 61. Specifically, the Office Action states:

[T]he 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. (Office Action, page 6, referring to claim 31; Office Action, page 13, referring to claim 61)

Thomason discloses that the operation of DMA controller 31 under the supervision of microprocessor 24 - i.e., the source object . . . (Office Action, page 7, referring to claim 31; Office Action, page 14, referring to claim 61)

28. The Office Action states that the operation of DMA controller 32 as supervised by microprocessor 24 in Thomason is the “transform object” as recited in claims 31 and 61. Specifically, the Office Action states:

[t]he operation of DMA controller 32 as supervised by microprocessor 24 - i.e., the transform object . . . (Office Action, page 7, referring to claim 31; Office Action, pages 14-15, referring to claim 61)

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. (Office Action, page 8, referring to claim 31; Office Action, page 15, referring to claim 61)

29. In discussing the claim element “wherein said source object is automatically flow controlled by said transform object,” the Office Action states:

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) (Office Action, page 7, referring to claim 31; Office Action, page 15, referring to claim 61; parentheses and citation in the original)

30. The portion of Thomason at col. 4:43-51 cited in the Office Action in support of this rejection is reproduced below.

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. (Thomason, 4:43-51)

31. The “*wherein said source object is automatically flow controlled by said transform object*” claim element requires that the transform object act to carry out flow control of the source object. Nothing in the Thomason text at 4:43-51 or elsewhere in Thomason teaches or suggests that “the operation of DMA controller 31 under the supervision of microprocessor 24” - the elements of Thomason that the Office Action has identified as the source object - is automatically flow controlled by “[t]he operation of DMA controller 32 as supervised by microprocessor 24” - the elements of Thomason that the office action has identified as the transform object. The description in Thomason cited in the Office Action for the “*wherein said source object is automatically flow controlled by said transform object*” claim element relating to the main memory (“until the main memory 36 is available to receive data”) pertains to a portion of Thomason downstream from, and after, the transfer of data from buffers 4 to buffer 35. The action of DMA controller 31 in performing the transfer of data from buffers 4 to buffer 35, or of the microprocessor 24 in instructing DMA controller 31 to perform this transfer, does not constitute “automatic flow control”.

32. By contrast, the '389 patent specifically describes automatic flow control involving, for example, the need for the source object to obtain a buffer from the (downstream) transform object, and explains that the self-regulating pipeline associated with storage in this design has automatic flow control:

To obtain the buffer, the source object 901 asks the down stream object in his pipeline for a buffer (allocEmptyBuf). The source object 901 is blocked until there is sufficient memory. This means that the pipeline is self-regulating; it has automatic flow control. ('389 patent, 8:45-49)

33. Thomason does not disclose “*wherein said source object is automatically flow controlled by said transform object*” as required by claims 31 and 61. To the contrary, Thomason teaches away from this, as it describes the movement of data from buffers 4 to buffer memory 35 with the assistance of DMA controller 31 in passive terms as explained above.

34. Krause does not teach or suggest “*wherein said source object is automatically flow controlled by said transform object*” as recited in claims 31 and 61 (and the Office Action does not assert otherwise). The combination of Krause with Thomason fails to teach or suggest “*wherein said source object is automatically flow controlled by said transform object*” as recited in claims 31 and 61.

D. The Office Action interpretation of “sink object”

35. I disagree with the interpretation in the Office Action of the term “sink object” recited in independent claims 31 and 61. The Office Action states:

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) (Office Action, p. 8, referring to claim 31; Office Action, p. 15, referring to claim 61)

36. In light of the disclosure and claims of the '389 patent, I believe that this is an improper interpretation of the term "sink object". The text from the '389 patent at 7:50 cited in the Office Action in support of this interpretation states that "The sources 801 produce buffers of data. Transforms 802 process buffers of data and sinks 803 consume buffers of data" ('389 patent, 7:49-51). While one of the actions taken by the sink object is to consume buffers of data, the sink object acts, and is acted on, in other ways as well, as shown in the following excerpts from claim 31:

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; ('389 patent, 15:3-10; emphasis added)

E. The combination of Thomason and Krause does not disclose or suggest "wherein said sink object is automatically flow controlled by said transform object" as recited in claims 31 and 61 of the '389 patent

37. In discussing the claim element "wherein said sink object is automatically flow controlled by said transform object," the Office Action states:

[T]he 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. (Office Action, p. 8, referring to claim 31; Office Action, p. 15, referring to claim 61)

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) (Office Action, page 9, referring to claim 31; Office Action, page 16, referring to claim 61; parentheses in original)

The cited Thomason text from col. 4, lines 52-61 is in turn:

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. (Thomason, 4:52-61, emphasis added)

38. The “*wherein said sink object is automatically flow controlled by said transform object*” claim element requires that the transform object act to carry out flow control of the sink object. Nothing in the Thomason text at 4:52-61 or elsewhere in Thomason teaches or suggests that “the operation of DMA controller 33 and the microprocessor 24” - the elements of Thomason that the Office Action has identified as the sink object - is automatically flow controlled by “[t]he operation of DMA controller 32 as supervised by microprocessor 24” - the elements of Thomason that the office action has identified as the transform object. The description in Thomason cited in the Office Action for the “*wherein said sink object is automatically flow controlled by said transform object*” claim element relating to the main memory (“until the main memory is available to output data”) pertains to a portion of Thomason upstream from, and before, the transfer of data from buffer 35 to buffer 14. The action of DMA controller 33 in performing the transfer of data from buffer 35 to buffer 14, or of the microprocessor 24 in instructing DMA controller 33 to perform this transfer, does not constitute “automatic flow control”.

39. By contrast, the '389 patent specifically describes the automatic flow control of the playback pipeline involving, for example, the need for the sink object to obtain a buffer from the (upstream) transform object:

The sink 903 is flow controlled as well. It calls nextFullBuf which tells the transform 902 that it is ready for the next filled buffer. This operation can block the sink 903 until a buffer is ready. When the sink 903 is finished with a buffer (i.e., it has consumed the data in the buffer) it calls releaseEmptyBuf. ReleaseEmptyBuf gives the buffer back to the transform 902. The transform 902 can then hand that buffer, for example, back to the source object 901 to fill up again. In addition to the automatic flow-control benefit of this method, it also provides for limiting the amount of memory dedicated to buffers by allowing enforcement of a fixed allocation of buffers by a transform. This is an important feature in achieving a cost-effective limited DRAM environment. ('389 patent, 8:52-65)

40. Thomason does not disclose “wherein said sink object is automatically flow controlled by said transform object” as required by claims 31 and 61. To the contrary, Thomason teaches away from this, as it describes the movement of data from buffer 35 to buffer 14 with the assistance of DMA controller 33 in passive terms (e.g. “[a]n adequate supply of data per channel must always be present in the buffer memory 35 to be able to keep up with the demand” at Thomason, 4:13-15) as explained earlier.

41. Krause does not teach or suggest “wherein said sink object is automatically flow controlled by said transform object” as recited in claims 31 and 61 (and the Office Action does not assert otherwise). The combination of Krause with Thomason fails to teach or suggest “wherein said sink object is automatically flow controlled by said transform object” as recited in claims 31 and 61.

F. Combining Krause with Thomason in the Manner Proposed in the Office Action Would Change the Principle of Operation of Thomason

42. In the section titled “Motivation to combine,” the Office Action states the following:

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. (Office Action, pages 10-11)

43. The combination proposed in the Office Action would significantly change the principle of operation of Thomason. To make the changes proposed by the Office Action in order to obtain a functional system would require a large number of significant changes and would fundamentally alter the principle of operation of Thomason.

44. In making these changes, one would also need to address a fundamental problem associated with acceleration controller 41 in Thomason. According to the Thomason specification, the acceleration controller 41 provides for fast forward and reverse functions:

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. (Thomason, 4:19-23, emphasis added)

45. These functions are not enabled by the system disclosed and described in Thomason. FIG. 1 of 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. There is nothing in Figure 1 or in the Thomason specification that shows any functional connection

between the user interface 26/user command ports 25 and the acceleration controller 41. Moreover, the acceleration controller is located downstream of both the data decompressor 13 and the d/a converter 12. The only input to the acceleration controller is analog video. In a system constructed in accordance with Thomason, the acceleration controller would be unable to perform the stated functions of providing for fast forward and fast reverse because it lacks the ability to receive and therefore act on (a) digital signals to provide fast forward and/or fast reverse; and (b) signals generated as a result of user commands. These are defects that the addition of I-frame location information collected prior to buffer 4 could not remedy, as there would be no useful way to provide that information (which pertains to the location of digital information in a compressed video representation) to the acceleration controller 41, a system element capable of receiving only uncompressed analog video. There would also be similar problems in providing user command signals related to “slow motion and frozen frames and frame stepping” (Thomason, 4:21-22) to the acceleration controller 41.

46. Even if an I-frame detector as disclosed in Krause were inserted prior to buffers 4 in Thomason as described in the Office Action, this change would not result in a functional system. Even “[k]nowing the locations of the I-frames in advance” (as stated in the Office Action, page 11) would not “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” (Office Action, page 11).

47. To obtain a functional system combining Krause and Thomason that would, as stated in the Office Action (page 11), “identify I-frames from other video and audio data prior to storage in buffer 4”, to thereby “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" (Office Action, page. 11), one would, in addition to inserting a block to identify I-frames prior to buffer 4, have to make the following additional changes to Thomason:

- 1) add a new acceleration controller connected to the bus (since the original acceleration controller 41 is unable to perform its stated functions as described above),
- 2) add a mechanism to store the identified I-frame location information and provide it as appropriate to the new acceleration controller,
- 3) remove or modify the original acceleration controller 41 to avoid conflicts with the new acceleration controller, and
- 4) modify the operations of the microprocessor, DMAs, buffer management, and user command handling to enable the I-frame location information to be used to carry out "operations such as varying speed reverse or varying speed forward" (as stated in the Office Action).

48. These changes would result in a new system, one that is different from the apparatus disclosed by Thomason. This hypothetical apparatus would operate in a very different manner from that taught by Thomason. The principle of operation disclosed by Thomason would be fundamentally altered such that Thomason would no longer operate as described. I do not believe that this combination would have been obvious to one of ordinary skill in the art.

49. I declare under penalty of perjury of the laws of the United States that to the best of my knowledge and belief the foregoing is true and correct.

Date: November 2, 2009



John D. Villasenor, Ph.D.

APPENDIX B

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re reexam of: U.S. Patent 6,233,389
(Barton)

Reexam Control No.: 90/009,329

Filed: November 10, 2008

For: **Multimedia Time Warping System**

Confirmation No.: 2859

Art Unit: 3992

Examiner: FERRIS, Frederick

Atty.Docket: 2513.002REX0

**Secondary Considerations
Declaration Under 37 C.F.R. §1.132**

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

Sir:

I, James M. Barton, declare and state that:

1. I am a co-inventor of the above-captioned patent, U.S. Patent No. 6,233,389, filed July 30, 1998 (hereinafter "the '389 patent").

2. I was a co-founder of Teleworld, Inc. Teleworld was the original name for the company now known as TiVo Inc. ("TiVo"). I currently serve as the Chief Technology Officer (CTO) and Senior Vice President of TiVo.

3. Prior to the invention described in the '389 patent, the entertainment industry was desperately searching for a commercial product to provide interactive television to consumers. Articles written around the time of the introduction of TiVo's first commercial digital video recorder (DVR) product recognize this long felt need in the entertainment industry and how other companies, including major cable companies, tried to meet the need and failed:

When Time Warner shut down the Full Service Network (FSN), its expensive experiment in interactive television, one year ago, the prospects for changing the state of broadcast television seemed bleak. Deborah Claymon, *TiVo Takes a Second Shot at Delivering Personalized Television Services*, RED HERRING, August 1998. (Exhibit 1.)

Hundreds of digital Captain Ahabs have in vain thrown golden harpoons at Interactive television, yet the whale has eluded them all. Time Warner's flop was one of the most costly. Its interactive experiment in Orlando, Fla. is rumored to have cost \$150 million before it was abandoned ... Captain Ahab went to his death chasing the Great White Whale, just as many an interactivity experiment has drowned. But one of these days someone's going to nail the critter. Julie Pitta, *Interactivity: the Great White Whale*, FORBES, September 21, 1998. (Exhibit 2.)

The purpose is what the TV industry calls "time-shifting," or enabling viewers to move their favorite programs to more convenient time slots. It's a step toward a long-awaited evolution of TV entertainment, video on demand – a service that would let viewers watch whatever program they wished whenever they wished. Jon Healey, *Start-up Aims for TV on Demand*, SAN JOSE MERCURY NEWS, August 21, 1998 (Exhibit 3.)

Interactive TV is coming, the executives cloistered here for a large trade show agree. It's just not happening fast enough for anyone's satisfaction ... Enhancing TV with digital smarts has been a promise long unfulfilled. "Interactive TV has been a tremendous flop over the past 20 years," said Phil Goldman, general manager of TV platforms for Microsoft Corp. *Interactive TV – Will it Ever Arrive?*, ZDNET AUSTRALIA, October 13, 2000. (Exhibit 4.)

4. Many of these early interactive television products and systems, such as the Time Warner Full Service Network, failed due to their cost and complexity. My co-inventors and I developed the inventions described in the '389 patent to deliver much of the promise of interactive TV but without the complexity and cost of prior failed solutions.

5. The claims of the '389 patent are directed to systems and methods that give a user the ability to simultaneously record and play back TV broadcast programs. Additionally, the claims of the '389 patent utilize an approach that decouples the microprocessor from high video data rates, thereby reducing the microprocessor and system requirements that are at a premium.

6. Claims 31 and 61 recite a process and apparatus (respectively) "for the simultaneous storage and play back of multimedia data." Claims 31 and 61 are reproduced below:

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

providing a physical data source, wherein said physical data source accepts broadcast data from any 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

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

a physical data source, wherein said physical data source accepts broadcast data from any 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;

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.

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.

7. Each of TiVo's commercial DVR products includes the features recited in claims 31 and 61. The use of the recited objects (source, transform, sink, and control objects) provides the ability for the system to simultaneously record and play back live TV broadcast as well as to reverse, fast forward, and pause live television, all in a cost-effective system. The delivery to consumers of these components of interactive television in a system at a commercially reasonable price point is the reason for the commercial success of TiVo's DVR products.

8. TiVo released its first commercial DVR device in early 1999. Over the next seven years, TiVo experienced steady and consistent growth of its DVR subscriber base. By fourth quarter 1999, TiVo had approximately 10,000 subscribers. Robert LaFranco, *I saw it on TiVo*, FORBES, November 29, 1999. (Exhibit 5.) By late 2002, TiVo had passed the 500,000 subscriber mark. *Jim Barton, TiVo*, INFOWORLD, December 6, 2002. (Exhibit 6.) In 2006, the number of subscribers had risen to over 4.4 million.

9. The commercial success of the TiVo DVR is further highlighted by the numerous awards and industry accolades received by the product since its introduction:

In 2006, the National Academy of Television Arts & Sciences selected TiVo as the first recipient of the Pioneering Development award in recognition for its creation of, development in and advancement of DVR technology and service. "With the advent of television services such as TiVo, we are presented with new opportunities to deliver programming to television viewers in ways that fit individual lifestyle needs and preferences," said Allan Benish, executive vice president of the National Academy of Television Arts & Sciences. "We have recognized TiVo for its integral role in developing technology to deliver a better entertainment experience for television viewers. Press Release, *National Academy of Television Arts and Sciences Recognizes TiVo as Pioneer In Creating and Leading the Digital Video Recorder Category*, PRNEWswire, October 17, 2006. (Exhibit 8.)

In 2005, the TiVo DVR was named the second best product since 1995 by CNET. The award noted that TiVo had "finally moved beyond 'pausing live TV' to an entertainment center essential that inspired a myriad of competitors, none of which even come close to having as good an interface." Tom Merritt, *The Top 10 Products*, CNET, 2005. (Exhibit 9.)

In 2005, PCWorld listed the TiVo DVR third in the list of the 50 greatest gadgets of the past 50 years. Dan Tynan, *The 50 Greatest Gadgets of the Past 50 Years*, PCWORLD, December 2005. (Exhibit 10.)

In 2005, I was named as one of the 29 innovators selected by the EETimes for "The Great Minds, Great Ideas Project." The purpose of the project was to celebrate "the people and technologies that rattle marketplaces and open new opportunities. These individuals don't just make products, they make a difference." In discussing my selection, the article explained: "Indeed, Barton helped create a cool new category – the digital video recorder (DVR) – at the increasingly crowded intersection of broadcasting and digital electronics." *Jim Barton: The Man Behind 'God's Machine' for Consumers*, EETIMES, 2005 (Exhibit 11.)

In 2005, TiVo was given the "OnDemand Technology Innovation Award – Cable, Satellite, Telco" by OnDemandies. (Exhibit 12.)

In May 2006, Michael Ramsay, co-founder of TiVo was awarded The Royal Academy's Sir Frank Whittle Medal for outstanding achievement in the field of "engineering innovations in games, entertainment and the media." As described in the news release, TiVo "invented, developed and delivered the very first digital video recorder (DVR), a device that allows television viewers to automatically find and record their favourite shows every time they're on, enabling them to watch what they want, when they want. Television on-demand enabled by DVRs, is regarded as one of the most important inventions in the history of television and is rapidly becoming a "must have" item for TV viewers throughout the world. Press Release, Royal Academy of Engineering, *TiVo Pioneer's Outstanding Achievement* (May 26, 2006)(Exhibit 13.)

In 2007, USA Today named TiVo one of the top 25 inventions that changed our lives since 1982. *25 Years of Eureka Moments*, USA TODAY, May 21, 2007. (Exhibit 14.)

10. The United States Patent and Trademark Office Museum recognized the importance of the TiVo DVR product when selecting it for inclusion in the exhibit entitled "The Invention Machine: A Day in My Life" designed to celebrate the nation's most influential inventions. The exhibit highlighted the benefits of the '389 patent (including claims 31 and 61) which as described above covers TiVo's proprietary technology for efficiently storing and playing back TV shows. *TiVo Joins the Collection of Nation's Most Influential Inventions*, ECOUSTICS.COM, July 20, 2005. (Exhibit 15.)

11. Commentators have also recognized that the commercial success of the TiVo DVR product introduced a dramatic paradigm shift in the way people watch television.

Please buy TiVo this holiday season, if fact, buy three. I say this because if TiVo – greatest invention since beer – were ever to go broke, I would shrivel up into a lump of Limburger mold and die ... TiVo is such a joy that even if there a game is going on that I want to watch, I purposely won't watch it live. I'll rotate my tires or catch up on my Wally Cox video collection while TiVo records the game, then watch it without delays or interruptions as soon as it's over. Do you know how much fun it is to go.

"Running play? Bomrrring" and zap right through it? Rick Reilly, *Greatest Invention, Period*, SI VAULT, December 22, 2003. (Exhibit 16.)

Is it possible for any other technological invention to surpass the TiVo for the label of top entertainment invention of all time? If you have ever had Tivo [sic] you already know what I am talking about, when you go to the home of someone without the gadget you cringe. You sit and ask yourself quietly, how did I live before TiVo? How was I able to watch my favorite shows with all of these mundane commercials blended in? Alex Carter, *Top Entertainment Invention of All Time: TiVo*, AC ASSOCIATED CONTENT MOBILE, April 16, 2007. (Exhibit 17.)

The chairman of the Federal Communications Commission is a new convert to the personal digital video recorder. "My favorite product that I got for Christmas is TiVo," FCC chairman Michael Powell said during a question and answer session at the International Consumer Electronics Show. "TiVo is God's machine." Jim Krane, *FCC's Chief Calls TiVo 'God's Machine'*, WASHINGTON POST, January 11, 2003 (Exhibit 18.)

12. The TiVo DVR embodying the features recited in claims 31 and 61 has become a fixture in American consumer culture as evidenced by its prominent mentions in television programs and movies as well as its inclusion as a question in the 20th Anniversary edition of Trivial Pursuit (Exhibit 19) and the New York Times crossword puzzle (Exhibit 20). The following is a partial list of television programs incorporating references to the TiVo DVR product into the show.

| | | |
|--------------------------|---|---------------------------|
| Modern Marvels | Ellen | Simpsons |
| South Park | Gilmore Girls | The Colbert Report |
| Today Show | Family Guy | American Idol |
| Entourage | Last Comic Standing | The Tonight Show |
| Tell Me That You Love Me | The Office | I Love the New Millennium |
| David Letterman | The Daily Show | The Hills |
| Curb Your Enthusiasm | Harold and Kumar Escape from Guantanamo Bay | |
| Tropic Thunder | | |

13. As further evidence of the commercial success of the product, TiVo has or had agreements with many large communications providers and equipment providers to distribute or make commercial DVR products including Comcast, DIRECTV, Cox, RCN, AT&T Broadband, Earthlink, Windstream, Sony, Philips, Toshiba, Pioneer, and Humax. TiVo further has expanded internationally having agreements with Seven Networks in Australia, Sky Broadcasting in the UK, and Li TV in Taiwan to distribute or make commercial DVR products.

14. As recognized by commentators in 2002, TiVo's successful efforts led competitors "to throw their knockoffs into the market that TiVo spent so dearly to create." Dorothy Pomerantz, *Do You TiVo?*, FORBES, November 25, 2002. (Exhibit 7.) At least one of these recognized "competitors," EchoStar satellite service had a "knockoff" product that infringed the '389 patent, including claims 31 and 61.

15. TiVo filed a patent infringement suit against EchoStar in January 2004 alleging infringement of the '389 patent, including claims 31 and 61. In April 2006, a jury found that EchoStar had willfully infringed the '389 patent (including claims 31 and 61) and entered an injunction which barred future infringement and required EchoStar to disable DVR functions of specified satellite receivers that EchoStar had wrongfully placed in consumers' homes. The Federal Circuit stayed the injunction pending appeal. That stay lasted until April 2008. By then, EchoStar had been infringing TiVo's patent for 7 years.

16. EchoStar's continuing infringement by providing DVR products and services diverted (and continues to divert) subscribers to EchoStar that are in TiVo's target

market. This reduces the number of subscribers in the DVR market available to TiVo and causes TiVo a loss of market share and business opportunity. Since DVR subscribers typically do not switch DVR providers, EchoStar has been able to build and increase its subscriber base.

17. In 2006, the DVR market was in a period of rapid growth and development. When the jury returned its verdict in favor of TiVo in April 2006, TiVo had well over 4 million subscribers, and that was still true when the district court issued its injunction in September 2006. Since the stay of the injunction in the fall of 2006, however, the number of TiVo subscribers has dropped significantly every quarter, for an overall loss of over a million subscribers to date. At the same time, EchoStar has gained DVR subscribers every quarter, and it has gone from fewer DVR subscribers than TiVo to twice as many DVR subscribers as TiVo.

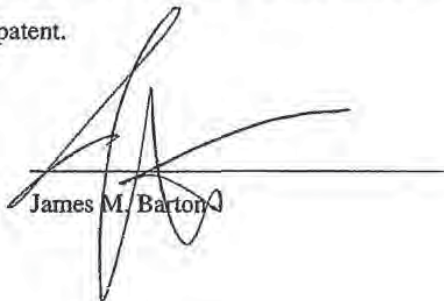
18. Exhibit 21 is a chart showing the DVR subscriber base for EchoStar and TiVo since 2006. It shows that TiVo lost over a half million subscribers and EchoStar gained over two million new subscribers while the Court's previous stay was in effect. The chart also shows that in the first quarter of 2006, EchoStar had approximately 3.6 million DVR subscribers, while TiVo had approximately 4.4 million. By the fourth quarter of 2008, EchoStar had nearly doubled its number of subscribers to 6.6 million, while TiVo's subscriber base had declined to just over 3.3 million – a drop of nearly 25%.

19. The data on EchoStar subscribers was supplied by MAGNA, an independent analysis and forecasting firm that is part of the Interpublic Group's Mediabrands unit. The data on TiVo subscribers is from company records. EchoStar financial quarters

correspond to calendar year quarters, while TiVo quarters run one month ahead of the calendar year.

20. All statements made of my own knowledge are true, and all statements made on information and belief are believed to be true. I acknowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the patent.

Nov. 2, 2009
Date


James M. Barton

ONE TO WATCH

TiVo takes a second shot at delivering personalized television services.



WE ARE TIVO: CEO Mike Ramsay and Chief Technology Officer Jim Barton.

WHEN Time Warner shut down the Full Service Network (FSN), its expensive experiment in interactive television, one year ago, the prospects for changing the state of broadcast television seemed bleak. But Jim Barton, then an executive at Silicon Graphics and one of the FSN's architects, wasn't ready to concede. That August he joined Mike Ramsay, another former SGI executive, to form Sunnyvale-based TiVo, the latest attempt to give consumers more control over the growing mass of TV content.

According to TiVo (formerly known as Teleworld), the FSN failed in part because its

centralized system could never scale to accommodate the millions of simultaneous requests from users. TiVo's solution is to move the processing of interactive entertainment directly into the home: the company has developed what it calls an extensible time-shifting architecture (ETA), a combination of proprietary silicon chips, other hardware, and application software that manages real-time streaming of audio and video. Much like a VCR (but without requiring complicated programming), ETA digitally records any television broadcast for later viewing. ETA also offers other VCR-like controls, such as pause and rewind functions, even for live broadcasts. The company hopes to license ETA to makers of televisions, set-top boxes, and VCRs, but TiVo will control the service.

The result, the company hopes, will be the first truly personalized television service. "With TiVo, people will never again be controlled by the broadcaster's schedule," claims Ed MacBeth, vice president of marketing and business development. The company has also created what it calls viewer-graphic profiling technology, which tracks usage so that it can recommend future programs and record intelligently; for example, the system will download only the *Seinfeld* reruns you haven't recorded yet.

TiVo plans to roll out its first service by mid-1999. To date, it has raised \$3 million in one round from New Enterprise Associates (tech guru Stewart Alsop represents NEA on the TiVo board), Institutional Venture Partners, and the founders. Another venture capital infusion of \$4.5 million was planned for early summer. ●

—Deborah Claymon

NEW COMPANIES

Startups on the Red Herring radar.

■ Cobalt Microserver of Mountain View offers Internet and intranet networking capabilities as an alternative to traditional NT or Unix systems. Its Qube microserver, which shipped in early May, provides email, file sharing, Web publishing, and group-based discussion capabilities all through a browser-based interface. The company has recruited seasoned management from Cisco Systems, Symantec, Digital Equipment, and Apple Computer.

■ Sunnyvale-based AtWeb is heeding all those surveys showing that most Web site owners spend as much maintaining a site as they do building it. The company's new service, Web Site Garage, provides business owners

with the first comprehensive set of software tools to tune up faulty Web sites and optimize the performance of Web applications.

■ Palo Alto's InXight Software, founded in 1996 as part of the Xerox New Enterprise program, has just updated its Hyperbolic Tree product, a 3D graphical user interface that enables users to "see" where they are when searching a complex database or Web site and understand how each piece of data relates to the entire body of information. The product is based upon information access technologies long held captive inside Xerox's Palo Alto Research Center and will work with products from partners SmartPatents, S3, SoftQuad, and Verity.

HERRING GRAPHICS / CYNTHIA WIGGINTON

With their black box startup, Jim Barton and Michael Ramsay must feel a lot like Melville's Captain Ahab.

Interactivity: the Great White Whale

By Julie Pitta

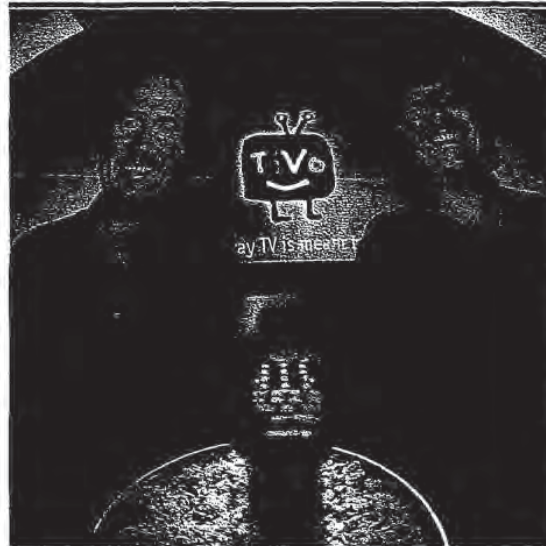
HUNDREDS OF DIGITAL Captain Ahabs have in vain thrown golden harpoons at interactive television, yet the whale has eluded them all. Time Warner's flop was one of the most costly. Its interactive experiment in Orlando, Fla. is rumored to have cost \$150 million before it was abandoned.

The idea, however, seems to make sense: Why not let people watch the programs they want to watch rather than the programs the network or cable system want to sell them?

The latest to try its luck at interactive television is TiVo Inc., a year-old Sunnyvale, Calif. startup founded by Silicon Graphics Inc. alumni James Barton and Michael Ramsay. Barton was among the Silicon Graphics engineers who designed Time Warner's interactive TV system. His partner, Ramsay, headed up the workstation division.

Barton figured that what sank the Time Warner effort was its cost and complexity. He left Silicon Graphics two years ago, before Time Warner killed Orlando. He set about building a set-top box designed to deliver much of what interactive TV was supposed to, but without the overhead. Barton and Ramsay started TiVo with \$3 million in venture capital. They raised another \$4.5 million in July.

Instead of storing digitized programs on giant centralized computer servers where subscribers can access them at will, Barton proposes



TiVo cofounders Michael Ramsay and James Barton
The lure of interactive TV entices yet another startup.

to store a limited variety of programs on set-top boxes. The cost of storage has dropped enough so that Barton figures it will be possible to store 20 hours of TV programming on a box that will cost about \$300.

How will TiVo's box know what programs to store? It will gather information on a family's viewing habits. Based on that user profile, the set-top box will select as many as 20 hours of programs.

Watch a lot of *Seinfeld* reruns? TiVo's set-top box is likely to suggest a broadcast of the comedian's HBO special. Any unviewed program is eventually erased to make room for new ones.

TiVo's set-top box is like a smart VCR in the sense that it can record any program. But its user interface is

far friendlier than that of the notoriously difficult-to-program VCR. Unlike TiVo's, video-on-demand services that copy television programs onto a centralized server must license that content from program creators. That can act as an obstacle to assembling a menu of shows or movies popular with viewers.

TiVo is negotiating with consumer electronics companies it hopes will manufacture the boxes—for a licensing fee—and have them in

dealers' hands by early next year. It also aims to collect \$10 to \$15 a month per viewer on the subscriptions. Another possible revenue stream is "addressable advertising." As the name suggests, this would replace the sponsorship advertising that would normally accompany the program with specialized commercials tailored to the individual box users' tastes. TiVo also hopes to exploit the interactivity to allow consumers to buy advertised goods, with TiVo getting a cut.

And so they still seek the White Whale. Cable companies continue to experiment with video-on-demand systems similar to failed interactive TV. With

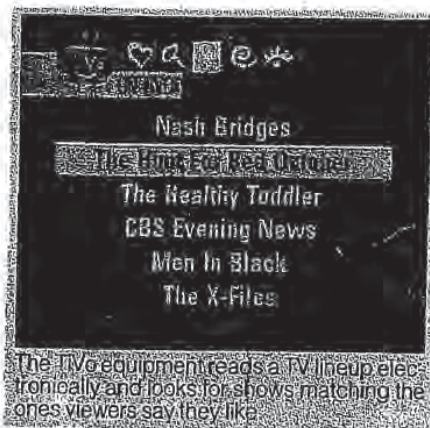
hardware and software prices having dropped dramatically, Cablevision has hooked up with Silicon Valley startup Diva Systems Corp. to offer a limited video-on-demand service.

"People came up with all sorts of reasons why interactive TV didn't work," says Barton. "The basic reason is centralized planning does not work. Why did the economy collapse in Russia? Because the Kremlin wasn't able to deliver what people wanted." Barton thinks his boxes will give consumers what they want rather than what TV programmers think they want.

Captain Ahab went to his death chasing the Great White Whale, just as many an interactivity experiment has drowned. But one of these days someone's going to nail the critter. ■

CLIPPING REPORT

San Jose Mercury News
August 21, 1998



Start-up aims for TV on demand

BY JON HEALEY
Mercury News Staff Writer

Start with the premise that watching TV is a good thing.

Add the supposition that there are many entertaining, worthwhile programs on TV, even though they never seem to be on when you're watching.

Finally, throw in the reality that most consumers would rather stare at a flashing "12:00" than learn how to program their VCRs.

These are the core tenets of TiVo Inc., a Sunnyvale start-up that hopes to

TiVo's aim is to let viewers

move favorite programs to

more convenient time slots.

transform the TV viewing experience. TiVo has developed what amounts to an intuitive VCR that scans the channels for programs its owner might like, then records them in an easy-to-use format.

The purpose is what the TV industry

calls "time shifting" or enabling viewers to move their favorite programs to more convenient time slots. It's a step toward a long-awaited evolution of TV entertainment, video on demand — a service that would let viewers watch whatever program they wished whenever they wished.

Several other companies have tried in vain to sell services or products that offered more control over the television lineup, analysts observe. For TiVo to succeed, they added, it may have to

“That’s (the monthly charges for the service) their biggest challenge.”

—Gary Arlen, analyst

TV on demand is the goal of Sunnyvale start-up TiVo

enlist some powerful partners among the TV manufacturers, broadcasters, cable companies and advertisers.

That’s a tall order, particularly without proof that the public will want TiVo’s service. The last major effort at time shifting was a pay-per-view network called Your Choice TV, which folded earlier this month despite the backing of cable giant Tele-Communications Inc.

In fact, while close to 90 percent of Americans have a VCR, analyst Larry Gerbrandt at Paul Kagan Associates said that fewer than 10 percent regularly record programs. Even though VCRs aren’t as hard to program as they used to be, people still like to watch shows when everyone else is watching them, said Bruce Leichtman, director of media and entertainment strategies for the Yankee Group.

“They are used to being dictated to,” Leichtman said.

On the other hand, viewers need more help than ever before sifting through the TV lineup, given the proliferation of networks. Just as companies such as Yahoo and Excite attract users by bringing order to the chaos of the Internet, so can TiVo succeed by helping people navigate the TV dial, said board member Geoff Yang, a partner at Institutional Venture Partners, a venture capital firm.

Officials at TiVo — veterans of the computer, microprocessor, Internet and cable TV industries — say they plan to try out the service with several hundred Bay Area consumers this fall. The company expects to launch the product formally in 1999, with tentative prices of \$10 a month for the service and something over \$300 for the equipment.

The monthly fee is for providing daily suggestions about shows, special packages oriented around themes, and other services aimed at narrowing the 8,000 hours of TV down to the few hours per day that match the user’s tastes. The monthly bill could be a tough sell, analyst Gary

Arlen said, adding, “That’s their biggest challenge.”

At first, the equipment will take the form of a VCR-sized box that users plug in between their TV and their antenna, cable box or satellite dish. The company’s hope, however, is that the equipment will someday be built into television sets.

The company’s ambition to change the way people watch TV is founded on two key technologies.

One is the ability to record TV signals on the kind of high-capacity disk found in computer hard drives, and to play back programs even while they are being recorded. In addition to giving viewers instant access to anything they record — no need to search through hours of tape — it lets people pause and rewind live programming. No more

The purpose is what the TV industry calls ‘time-shifting,’ or enabling viewers to move their favorite programs to more convenient time slots.

waits for instant replays, no more crucial scenes missed while answering the doorbell.

The other is the ability to record programs based on a viewer’s identity or preferences. In essence, the TiVo equipment reads the TV lineup electronically and looks for shows matching the ones viewers say they like — and rejecting ones they don’t like, or have already seen.

Naturally, the more users reveal about their likes and dislikes, the better TiVo performs. The TiVo remote control enables viewers to tell the equipment what they love, what they like and what they hate.

The result, said CEO Michael Ramsay, is that viewers can come home, turn on the TV and call up the programs they want to watch, not neces-

sarily the ones dished out by the networks. For example, "Must See TV" on Thursday nights could be transformed into three hours of Gilligan's Island reruns — shows that TBS broadcasts at 5 a.m.

The TiVo technology also can grab advertisements and insert them into shows. That way a young family watching "Murder, She Wrote" could see a Fampers spot that the TiVo equipment inserted in place of a Depends ad, based on what the family had told TiVo in the past.

Advertisers long have targeted their pitches to specific audiences, but the best they can do today is align themselves with TV programs geared toward certain age groups and tastes. TiVo could not only let advertisers target individual consumers, but also tell advertisers what those consumers liked and disliked, said Robert Poniakowski, TiVo's director of product marketing.

Ramsay said it would be up to viewers to decide how much to divulge to advertisers, although viewers could be given incentives to reveal information about themselves. Added Ed McBain, TiVo's vice president of marketing and business development, "We take the privacy issue very, very seriously, as to the advertising partners we're working with."

The company also is talking to broadcasters about ways to develop special packages for TiVo users. One of the networks that has expressed an interest in the company is HBO, a premium cable service that survives on subscription fees, not advertising dollars.

Kevin Dowdell, vice president of interactive ventures for HBO, said the company would love to make all of its shows available on demand on its subscribers, and TiVo is a step in that direction. "I think of it as a pretty big step beyond a VCR," Dowdell said.

"And it's not easy," he added. "We live in a world of standardized electronics and big players that have a lot of control. They have to convince many of the key players in the industry to use it and come up with a business model that works all the way around."

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This story was printed from [ZDNet Australia](#).

Interactive TV-- Will it ever arrive?

October 13, 2000

URL: <http://www.zdnet.com.au/news/soa/Interactive-TV-Will-it-ever-arrive-/0,139023165,120104142,00.htm>

LOS ANGELES -- Interactive TV is coming, the executives cloistered here for a large trade show agree. It's just not happening fast enough for anyone's satisfaction.

At the Western Cable Show, cable moguls, programming gurus and advertising experts differed in opinion as to how quickly TV watchers will want to interact with their televisions - be it by calling up information, shopping or otherwise being distracted from the show they are watching.

The gathering may be convinced that interactive TV is inevitable, but by no means do they think it will come soon.

"TV is a really passive experience to begin with. It's called the stupid box for a reason," said Kirsten Jansen, director of new media research for content maker Lunatic Fringe.

Market researcher Jupiter Communications, however, believes that more than 30 million interactive TV set-top boxes will serve as conduits for producing some \$10 billion in sales in 2004.

But cable companies and content makers are not so sure interactive TV sales will come that quickly.

A creator of video content for music videos and commercials, Lunatic Fringe is now wondering whether it should advise its clients to add interactivity to their programs. "We don't want to invest all this time and money if it flops," Jansen said.

Jansen cannot be blamed for being skeptical. Enhancing TV with digital smarts has been a promise long unfulfilled.

"Interactive TV has been a tremendous flop over the past 20 years," said Phil Goldman, general manager of TV platforms for Microsoft Corp. (Nasdaq: MSFT), during a panel discussion. "One of the things that we have learned is that content is hard to make."

Not only that, but the infrastructure that cable companies need to install to make interactivity work is daunting, said Richard Fisher, executive vice president of interactive e-commerce content maker RespondTV Inc.

"America Online deals with 1.2 million or so subscribers online at peak usage. Imagine that 'ER' is on and 5 million people click on an interactive element," he said. The result: A storm of requests for data with which even the most robust network will have trouble dealing.

RespondTV's solution is a better infrastructure so that advertisers can offer products that people can buy interactively using only their remote control.

Another problem for the industry is that no one can agree on just what interactivity is.

Ted Turner, vice chairman of Time Warner Inc. (NYSE: TWX), spoofed what some interactivity proponents have been advocating.

"Being able to make a sports game turn out the way you want it to will be a feature that people want," he said. "If you want to press a button to make your team win when watching a game, no matter what happens in reality, we'll have to deliver that to you. You won't even have to ever deal with reality."

Others argued people don't want to change the story; they just want to enjoy it.

"People will always want to sit down and passively access a story," stressed Barry Diller, chairman and CEO of USA Networks Inc. (NYSE: USA). "It started with campfires, and it will continue."

Michael Bloomberg, president and CEO of Bloomberg L.P., agreed. "I don't think people are going to customize a show," he said. "People will instead say, 'I have two hours and I want to spend them the best way possible.' Another is that they want to watch the shows they like, when they want."

That's a problem that a new device, known as the personal video recorder, has been designed to solve. TiVo Inc., ReplayTV Networks Inc. and Microsoft have rolled out products that allow users to program what they want to watch and when. Letting consumers customize TV viewing could help solve traffic spike problems to interactive sites described by RespondTV's Fisher.

So-called smart TV technology isn't so appealing to advertisers, however, who fear users will fast forward past their messages.

It's an old problem with a new twist, Bloomberg said. "We want to use technology to get more ads to the consumer, and the consumer want to use the technology to have less ads. That a normal battle."

One solution might be product promotions built right into the programming, like Jeff Goldblum's use of an Apple Macintosh portable in "Independence Day." With the ability to add touch-of-a-button interactivity, consumers might be tempted to seek more information or even purchase an item featured during a program.

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I saw it on Tivo

Robert La Franco, 11.29.99

NEW YORK - Visit an electronics store in the U.S. this fall and you will see television's future. For \$15,000 you can take home a 43-inch high-definition screen that can show a rattlesnake slithering through the desert with astounding picture clarity. For \$1,000 you can get the next-hottest consumer electronics item, a Tivo-branded personal video recorder.

Tivo's box is nothing to look at, but, with or without a hookup to a high-definition screen, it can change the way you watch TV. Tivo sits between the signal reception and the screen, replaying it after a brief delay. This allows the viewer to pause live television to go to the bathroom or yell at the kids and not miss a beat (the delay lasts until you are ready to watch again). Or, as with a VCR, viewers can store programs for future viewing, using a built-in hard drive.

More interesting, for \$10 a month, the Tivo service can find, based on a viewer's past preferences, programs he might like. No need to go hunting through a whole program log—just click them on at air time or have them recorded for later. Ultimately the service could feed targeted advertising—rather than the generalized stuff aired to everyone—and the chance to buy products with a button push.

For now Tivo is encased in boxes made by Philips Electronics, but the future lies in plugging the service into existing devices, such as cable set-top boxes, DVD players and even television sets. For the confirmed couch-dweller, this is big stuff. There are some 10,000 subscribers who've already plunked down between \$500 and \$1,500 for Tivo-like capability, and Forrester Research predicts those consumers will be joined by 14 million others in the next five years.

Sure, Tivo is a triumph of the entrepreneur, bringing to market a service that giants like Time Warner and GTE have repeatedly failed at. The question is whether Tivo, based in Sunnyvale, California, is the company to make the big sale. It has impressive partners: America Online, the component makers Sony Corp. and Philips, networks such as NBC and CBS, and the cable operators Comcast and Cox Communications. And it's gotten a nice pop on Wall Street, where it began trading in September at \$16 and has since climbed to \$39.

But as yet Tivo is just a tiny business. For the first nine months of 1999 its revenues from subscription fees totaled only \$41,000; its losses, \$32 million. And it has fierce competition. Replay Networks, which makes its own boxes and sells them over the Internet, already has some of the very same big partners, as well as others, such as Earthlink's founder, Sky Dayton, and Netscape's founder, Marc Andreessen. And for far less than the \$11 million Tivo has spent so far on marketing, Replay reportedly has almost as many boxes installed.

Without doubt, Tivo's stock flotation has given it a jump: a \$1.4 billion market valuation and a cash hoard of \$150 million. "Getting to the consumer market is expensive," says Tivo's CEO, Michael Ramsay. "But there is a time-to-market advantage here. Our plan is to run as fast as we can." If he is fleet of foot, Tivo will become a kind of Yahoo for the television set.

Securing that position won't be easy, since there are plenty of alternatives emerging. Microsoft has unveiled plans to install its own search-and-record service in Echostar satellite TV receivers. There are other interactive devices out as well, including one from OpenTV, of Mountain View, California, which recently filed for its own offering.

The technology of searching and recording, which is not protected by patents at the moment, can easily be copied and installed in such devices as cable set-top boxes or DVD and CD players. Tivo will need to differentiate itself, as well as assuage the fears of its own broadcast partners—CBS, Discovery Networks, News Corp., Walt Disney and Time Warner—which have formed a coalition to keep the services' commercial-skipping ability from violating their copyrights.

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As the number of entrants into the market increases, Tivo is, in some respects, winging it. Ramsay concedes that today's subscription model is most likely a stopgap until advertising and promotion money starts flowing in. Technology cheerleader Josh Bernoff, an analyst at Forrester Research, believes that the services are all in the early stages and that the real killer application will come when the devices can interpret viewing patterns more intelligently--say, tracking down Tom Hanks romantic comedies and storing them for future viewing. Tivo may not be the first to come up with that one.

"This Christmas these companies will try to bash each other's brains out," says Bernoff. "It's a little early to be declaring victory."

1 of 1

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InfoWorld Home / Storage / Jim Barton, TiVo

DECEMBER 06, 2002

Jim Barton, TiVo

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As CTO and senior vice president of research and development at TiVo in Amiso, Calif., Jim Barton sees himself as an educator rather than an information machine.

Barton works very closely with TiVo R&D, overseeing a staff of five top TiVo engineers and developing technology and services for the digital-video recorder company. He also weighs in on company and product strategy and says he acts as a "go-between to help make sure the stuff we're doing in R&D matches up with how our IT systems are being moved forward."

The company just passed the 500,000 subscriber mark. One challenge for Barton is to protect people's rights to fair use of content coming into their homes while also making sure copyright owners have reasonable control over what is happening with their content. For users, TiVo represents a step toward a new idea of how to define a computer.

With each TiVo receiver having 35GB of disk storage, the total storage remotely managed by TiVo over its distributed system is into the "tens of petabytes," Barton says.

And yes, Barton does have a TiVo -- actually, he has six of them, some dedicated to particular topics such as educational shows or "fun" shows. As for his current top show, the CBS drama "CSI," Barton says "of course, I never miss an episode."

-- S.S.

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Do You TiVo?

TiVo singlehandedly created the market for digital television recorders. Profits don't go with that accomplishment
<http://www.forbes.com/forbes/2002/1125/054.html>

By Dorothy Pomerantz

Thank goodness for pioneers. Someone had to open the West, invent FM radio and develop the digital TV recorder market. But the hardy souls who break new ground don't always fare well.

Read the despairing disclosure statement for an October financing for TiVo Inc., the Alviso, Calif. pioneer in TV recording. The 11,200-word confession explains that the company will probably continue to lose money "for the foreseeable future." The stock, once at \$79, is down to \$4 and change.

TiVo's gadget allows a TV addict to digitally capture a show for later playback. The system beats the old-fashioned VCR because (a) it's easy to program--it knows when your favorite show is on--and (b) it lets you fast-forward through annoying ads. Great idea, but TiVo has nearly killed itself persuading consumers just how great. So far the company has racked up half a billion dollars in losses while winning a mere 464,000 subscribers. It takes some heavy salesmanship to get people to pay \$300 for the recording device plus \$13 a month for the digital signals that provide program times and thus tell the box when to start recording.

"TiVo did the heavy lifting. Now I think they're going to flame out," says Manu Mehta, the founder of Metabyte Networks, a small (less than \$1 million sales) Silicon Valley outfit that has big plans to knock TiVo off its perch. Metabyte, funded in part by Scientific-Atlanta, sells software that helps TV viewers digitally record from an on-screen menu, much like TiVo. Metabyte has a deal with Scientific-Atlanta to put his software in new boxes that AOL Time Warner's cable unit is already installing in Rochester, N.Y., Green Bay, Wis. and Austin, Tex.

The greater problem confronting TiVo, like other consumer electronics pioneers before it, is that by working so hard to promote its brand while also educating consumers about what it does, it sowed the seeds of its own destruction. Upstart competitors, including Sonicblue's ReplayTV, Paul Allen's Digeo and a digital recorder offered by the EchoStar satellite service, have been able to throw their knockoffs into the market that TiVo spent so dearly to create.

Since its inception in 1997, TiVo has spent \$178 million on sales and marketing, more than twice the \$79 million it spent on R&D during the same period. The money went into such things as the "TiVo, TVYour Way" 2000 national advertising blitz.

The good news is that direct marketing outlays--meaning rebates and some television advertising--have dropped, from a peak of \$102 million in 2000 to \$29 million last year. The bad news is that something else called "sales and marketing--related parties," jumped 41%, to \$76 million last year. Add it up, and TiVo has spent \$767 to win each of its 464,000 subscribers.

The related parties are the myriad partners TiVo has aligned itself with to help promote its brand: AOL Time Warner, DirecTV, Philips, Sony, Creative Artists Agency and so on. But these folks don't do anything for free. In the past TiVo has had to expense the cost of the cobranding, either in the form

of direct subsidies, or as a noncash charge to amortize stock and warrants issued in return for services.

As a model for future deals, TiVo has agreed to give up a substantial chunk of its subscription fees to its largest partner, DirecTV, in exchange for hyping the service. These fees are the company's largest source of revenue and second-most-profitable business, behind technology licensing, and are expected to account for 62% of \$61 million in sales for the fiscal year ending next Jan. 31, according to Matthew McCormack, an analyst with Friedman, Billings, Ramsey & Co.

But these revenues are especially shaky if TiVo finds itself in a price war with the upstarts. The company has to share the same percentage of subscription revenues with its partners, irrespective of whether it's practically giving the service away.

For now at least, TiVo's 52-year-old Scottish chief executive, Michael Ramsay, is nonchalant about the competitive threat and the price he has paid for creating a new service.

"It's nonsense that the pioneers are the ones who get the arrows in their backs," says Ramsay. "Like many small companies, we've had our challenges with growth and all the things that have impacted companies because they can't raise capital. But we've weathered the storm and become a higher-profile company than when we came in." Investors, though, don't want profiles. They want profits.

TiVo Wins Prestigious Emmy Award for Outstanding Achievement

National Academy of Television Arts and Sciences Recognizes TiVo as Pioneer
In creating and Leading the Digital Video Recorder Category

SAN JOSE, Calif., Oct. 17 /PRNewswire/ -- Yesterday, during an official ceremony in New York, the National Academy of Television Arts & Sciences awarded TiVo Inc. (Nasdaq: TIVO), the creator of and leader in television services for digital video recorders, with the highly coveted Emmy award. This year, the Academy has created a new category to recognize contributions made by the pioneers of the digital video recorder (DVR) industry to the TV viewing experience. TiVo was awarded the Emmy for this new category in recognition for its creation of, development in and advancement of DVR technology and services.

"With the advent of television services such as TiVo, we are presented with new opportunities to deliver programming to television viewers in ways that fit individual lifestyle needs and preferences," said Allan Benish, executive vice president of the National Academy of Television Arts & Sciences. "We have recognized TiVo for its integral role in developing technology to deliver a better entertainment experience for television viewers."

The Emmy award acknowledges TiVo as an original creator of DVR technology and services, and the benefits these advancements bring to television viewers. The Pioneering Development award also provides high-level recognition for the company's influence and development of the overall category. TiVo's leadership was also recognized earlier this year when the company was awarded a patent for pioneering inventions associated with digital video recording software and hardware design.

"Co-founder Michael Ramsay and I founded TiVo with the dream of inventing a revolutionary service that would give consumers unprecedented control over their television viewing," said Jim Barton, CTO & senior vice president, research and development of TiVo. "The response to TiVo has been phenomenal, from the feedback we receive from our enthusiastic customers to the growth of an entire category rooted in our dream. The Academy's recognition for our leadership further demonstrates the strides TiVo has made to revolutionize television viewing."

TiVo's DVR

TiVo powers a digital video recorder and works with every TV system to digitally record television programming. TiVo's DVR is easy-to-use and improves the way people enjoy television by offering the capability to pause, rewind, create slow motion and even replay live TV instantly. With a simple touch of the button, TiVo's Season Pass(TM) will track and record every episode of your favorite shows, even if the schedule changes. Plus, with TiVo's Wish List(TM), TiVo will automatically find and record shows

featuring viewer's interests. What's more, subscribers can say goodbye to scheduling conflicts with the ability to record two shows at once with DIRECTV Receivers with TiVo.

About National Academy of Television Arts & Sciences
NATAS is a professional service organization for all aspects of the Television, Cable and Satellite industries. Its classic symbol of excellence, the Emmy, is awarded in five major national categories: Daytime, News & Documentary, Sports, Technological/Engineering and Community Service. Local Emmys are given in 18 regions across the United States. Beyond awards, the Academy has extensive educational projects, scholarships, publications, and major activities of impact to both industry professionals and the viewing public itself.

About TiVo Inc.
Founded in 1997 with the mission to dramatically improve consumers' television viewing experiences, TiVo is the creator of and leader in the growing digital video recorder (DVR) category. TiVo's easy-to-use DVR was the first to deliver on the promise of consumer choice and control over TV viewing, and has won the company numerous industry accolades including a patent for pioneering inventions associated with DVR software and hardware design. TiVo's DVR gives subscribers the power to reshape the TV timetable to work around their busy family life, not the other way around. The convenience and control TiVo provides continues to build a loyal and passionate subscriber base that has grown over 300 percent in size during this past year.

Today, the powered DVRs are available in the United States through the Philips Personal TV Recorder(TM) and the Sony Digital Network Recorder(TM) and DIRECTV Receivers with TiVo in nearly 3500 consumer electronics retail and online outlets and in the UK under the Thomson Scenium brand. TiVo is headquartered in San Jose, CA. Revenues for fiscal year ended December 31, 2000 were \$3.6 million. Additional information can be found at <http://www.tivo.com>.

On The Inside: Brian Andrews on Nude Photo Nightmare

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Power of 10: The past, present, and future of digital living

CELEBRATING CNET'S 10th ANNIVERSARY

THE POWER OF 10 The past, present, and future of digital living

Top 10 products

By Tom Merritt
Gadgets of every description have flowed through the doors of CNET for 10 years. Picking a list of the 10 best is an exercise in healthy but vocal arguments. Everyone has a different idea of what is meant by best. You can make great arguments for the Diamond Multimedia Rio 300, Mac OS X, the Sony PSP, and many more gadgets that aren't on our list. But the 10 we've included here had the most wide-ranging acceptance. Don't agree? Good. Tell us your top 10 in TalkBack.

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1 iPod (2001)

No other product has had the incredible, loyal devotion that the iPod inspires. It's also one of only a handful of products to get a 9 rating from CNET. It revolutionized and popularized music players with its stylish design and is still considered the industry leader. Even if you devoutly believe other music players have better features now, you have to acknowledge that iPod is still the king.

2 TiVo (1999)

It took a long time for people to even get the concept of what TiVo was. It has finally moved beyond "pausing live TV" to an entertainment-center essential that inspired a myriad of competitors, none of which even come close to having as good an interface. Plus, it has Linux inside, which gives it extraspecial geek points.

CNET community's Top 10 products

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The 50 Greatest Gadgets of the Past 50 Years

Here's PC World's official (and entirely idiosyncratic) list of the top tech gadgets of the last half century.

Dan Tynan, special to PC World, and PC World Staff

Dec 24, 2009 1:00 am

Dell Small Business Servers: Collaboration, mobility, and security made easy. Learn the benefits of server-based networking.

How to Buy a Printer: PC World explains how to choose a printer that's appropriate for your needs. Read the buying guide.

3. (Tie) **ReplayTV RTV2001 and TiVo HDR110 (1999)**



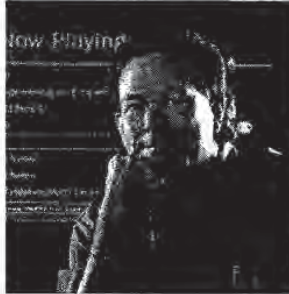
The appearance of the first ReplayTV and TiVo models—the pioneering Gemini of digital video recording—in the number three spot on our list may be a measure of how much we all hate TV commercials. The concept is simple: Digitize the TV signal and stream it to an internal hard drive, so the user can pause, rewind, fast-forward, or record programs at will. For the first time, users flummoxed by their VCRs (#29) could record an entire season of shows with a few clicks of the remote. And yes, it may be cheating to count these two products as one, but they appeared at virtually the same time, and each brought different yet important strengths to the DVR table. TiVo undoubtedly won the brand-recognition competition: When Janet Jackson suffered her infamous “wardrobe malfunction” at the 2004 Super Bowl, thousands of viewers “TiVo’d it”—over and over and over. ReplayTV, on the other hand, was more aggressive with commercial-skipping and networking features. In any event, the success of these products may be their undoing, as digital video recorders become a standard feature of cable and satellite set-top boxes. Eric W. Lund has more than you'd probably want to know about earlier models of both. *PCW photo by Rick Rizner.*




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'Sensitivity to consumers' yields one important lesson: Keep it simple

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JIM BARTON

THE MAN BEHIND "GOD'S MACHINE" FOR CONSUMERS

ESSAY

More than 2 million couch potatoes now routinely pause, fast-forward and automatically "TiVo" their favorite TV shows, thanks to Jim Barton. Adding his voice to the crowd, former FCC chairman Michael Powell called TiVo "God's machine" and, in a candid moment at the 2003 Consumer Electronics Show, said it was his favorite Christmas present.

Indeed, Barton helped create a cool new category—the digital video recorder (DVR)—at the increasingly crowded intersection of broadcasting and digital electronics. "Of all the people I have met from Silicon Valley who tried to bridge the SoCal entertainment and NorCal technology worlds, Jim was the one with the clearest sensitivity to consumers," said Stephen Ste. Marie, who as marketing chief of satellite-TV company DirecTV sat on TiVo's advisory board in its formative years.

A level-headed ideas man who colleagues say can doggedly stick to his opinions, Barton earned his stripes in the 1990s defining the Full Service Network, Time Warner's Orlando, Fla., prototype of a 500-channel interactive-TV network.

The FSN failed, but Barton took away valuable lessons about the importance of simplicity over interactivity in consumer electronics.

Given the intense competitive pressure in the DVR sector, TiVo's future is unclear today. But there's little doubt that Barton will continue to be influential. A gentle behind-the-scenes guy with a quiet, clear intensity and a voice so soft it often fades away when taped, Barton has plenty of ideas for a young digital-media world still ripe for disruptive innovation. "I'm the guy who comes in to get things started, getting things rolling and getting people interested," Barton said.

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Digital Hollywood

OnDemandies - Industry Awards

2005 Santa Monica Beach Hotel
March 30 - April 1, 2005

Note: The **OnDemandies Consortium** will meet in Committee Dinner on Tuesday, March 28th at Digital Hollywood Spring. The next OnDemandies Awards event will be held at Digital Hollywood Fall, October 24th in Santa Monica - Submission instructions will be posted here in July, 2006.

Archive of Last Year's Awards
Thursday, March 31st, 2005
5:00 PM - Poolside at the Loews Santa Monica Beach Hotel
The OnDemandies
The Industry Awards To Recognize the Highest Standards of Achievement in On-Demand Entertainment & Technology

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The OnDemandies - Winners & Runner-Up
I. OnDemand Industry Innovation Award
Winner - Apple Computer and iTunes
Runner-Up - Comcast

II. OnDemand Programming Innovation Award
Winner - AOL Music On Demand
Runner-Up - NFL Network "NFL Replay"

III. OnDemand Technology Innovation Award - Cable, Satellite, Telco
Winner - Telco
Runner-Up - Comcast Media Center

IV. Innovation in OnDemand & DTV Cable, Satellite or Telco, Broadband Movie Service
Winner - Movielink
Runner-Up - AtomFilms

V. Innovation in OnDemand & DTV Cable, Satellite or Telco, Broadband Sports Service
Winner - NASCAR on TV, DTV and Online
Runner-Up - ESPN OnDemand and ESPN.com


VI. Best Broadband Music or Information Service
Winner - Apple iTunes & iTunes Music Store
Runner-Up - Rhapsody

VII. Best Mobile Music Service
Winner - XM's Portable Satellite Radio
Runner-Up - SIRIUS Satellite Radio

VIII. Best Mobile Video Service
Winner - CNN Content on Verizon Phones
Runner-Up - MobTV


IX. Best Mobile Games Publisher and Service
Winner - JAMDAT Mobile
Runner-Up - (M)FORMA


X. Best Broadband On-Demand Streaming and/or Download Video Service
Winner - CNN NewsPass
Runner-Up - AtomFilms




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News Release

26 May 2006

TiVo Pioneer's Outstanding Achievement

The sixth winner of The Royal Academy's Sir Frank Whittle Medal has been named as Michael Ramsay, co-founder of TiVo Inc., the creator of and leader in digital video recorder technology, for his outstanding achievement in the field of 'engineering innovations in games, entertainment and the media'.



The Royal Academy of Engineering Sir Frank Whittle Medal reflects the spirit of the late Sir Frank Whittle OM KBE CB FEng FRS, one of the most creative engineers of all time. This medal is "awarded to an engineer, with strong connections with the United Kingdom, for outstanding and sustained achievement which has contributed to the well-being of the nation". The field of activity changes annually.

Michael Ramsay pioneered the TiVo technology that is changing the world of home entertainment - the culmination of a lifetime of innovation in computer graphics, workstations and consumer software technologies.

In 1997 he co-founded Teleworld, which became TiVo Inc., the company that invented, developed and delivered the very first digital video recorder (DVR), a device that allows television viewers to automatically find and record their favourite shows every time they're on, enabling them to watch what they want, when they want. Television on-demand enabled by DVRs, is regarded as one of the most important inventions in the history of television and is rapidly becoming a 'must have' item for TV viewers throughout the world.

With DVRs, TV viewers can pause live TV, fast-forward through advertisements and set-up TiVo Season Pass™ recordings for their favourite series and never miss an episode. Under Ramsay's steer, these innovations have sparked a revolution in home entertainment where viewers are taking control of their home entertainment away from the major broadcast networks. While the technology was pioneered by TiVo in the US, DVRs are now available and popular in Europe and Asia. In the US alone, ten million DVRs are now installed in homes; of these over 4.4 million subscribe to the TiVo service.

Using a complex technology that has never been duplicated by its competitors, over the last 8 years the company has amassed a large portfolio of patents and proprietary technology that is a testament to its innovation and market leadership.

Prior to TiVo, Ramsay was a senior executive at Silicon Graphics Inc (SGI), from 1986-1997. In 1994 he became president of Silicon Studio, a subsidiary of SGI that he founded to pioneer the development of 3D graphics technology that revolutionized the movie and game industries. Ramsay's products were used to create the special effects and 3D animations for movies such as Jurassic

Park, Terminator 2 and other blockbusters. The technology has enabled animators and special effects artists to create realistic and compelling experiences, impossible to duplicate in any other way - to the delight of movie audiences worldwide.

Michael Ramsay is a native of Edinburgh who moved to California's Silicon Valley in 1975 to pursue a career opportunity with Hewlett-Packard. He received a BSc (First Class Honours) in Electrical Engineering from the University of Edinburgh in 1972.

ends

Notes for editors

1. The Royal Academy of Engineering Sir Frank Whittle Medal reflects the spirit of the late Sir Frank Whittle OM KBE CB FEng FRS, one of the most creative engineers of all time. This medal is "awarded to an engineer, with strong connections with the United Kingdom, for outstanding and sustained achievement which has contributed to the well-being of the nation." The field of activity changes annually.
2. The Whittle Medal was first awarded in 2001 to the creator of the world-wide web, Professor Tim Berners-Lee OBE FEng FRS for his achievements in communication. In 2005 the Medal was awarded to world expert in electrical and electromagnetic devices, Professor Peter John Lawrenson, Emeritus Professor, Department of Electrical Engineering, University of Leeds in recognition of his generally applicable design methodologies and the development of electrical machines used worldwide, including the invention and commercialisation of switched reluctance drives.
3. Frank Whittle was born in Coventry in 1907, the son of a skilful mechanic and inventor. From an early age he experimented in his father's factory and was fascinated by the fledgling aviation industry. He joined the RAF in 1923 as an apprentice. His talents were soon recognised and he qualified as a pilot at the RAF College, Cranwell, before reading Mechanical Sciences at the University of Cambridge. While at Cranwell he had developed a thesis on jet propulsion and patented his design in 1930, but officials at the Air Ministry dismissed his ideas as impractical. However, in 1936 he and some associates founded a company, Power Jets Ltd, to develop the theory. Despite political and financial adversity, Whittle's jet engine made its maiden flight on 15 May 1941, powering the purpose-built Gloster E28/39. By 1944 the engine was in service with the RAF. The technology quickly spread and has been fully exploited worldwide.
4. Founded in 1976, The Royal Academy of Engineering promotes the engineering and technological welfare of the country. Our fellowship - comprising the UK's most eminent engineers - provides the leadership and expertise for our activities, which focus on the relationships between engineering, technology, and the quality of life. As a national academy, we provide independent and impartial

advice to Government; work to secure the next generation of engineers; and provide a voice for Britain's engineering community

For more information please contact:

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25 years of 'eureka' moments

We're a nation of inventors in garages and corporate labs, creating gadgets and services that delight us and occasionally drive us crazy. USA TODAY chose inventions that changed our lives since 1982. Disagree? Tell us at usatoday.com, and we'll post your picks.

2 Laptop computers

The 28-pound Compaq Portable was the first IBM-compatible portable PC on the market. More than 53,000 sold in the year after its 1983 launch, despite a price usually topping \$3,000. Since then, laptops such as the ThinkPad T60, left, have gotten much smaller and cheaper.



1 Cellphones

Car phones were around in the 1970s, but it wasn't until 1983 that Motorola introduced the first widely available handheld cellphone. The DynaTAC 8000x weighed almost 2 pounds and cost \$3,995.



3 BlackBerrys

An obscure Canadian paper company, Research In Motion, shortened attention spans around the world with the launch of the BlackBerry mobile e-mail device in 1999.

4 Debit card

Ka-ching! Who needs cash when you've got a debit card? They took off after Visa launched its card in 1995. Before then, fewer than 2% of Americans used debit cards. Ten years later, debit card transactions exceeded those on credit cards.

TOP 25

Life-changing inventions

USA TODAY counts down to its 25th birthday Sept. 15 with commemorative Top 25 lists here and online every week.

5 Caller ID

800 collectors and your annoying Uncle Ned are easy to ignore with this invention introduced by BellSouth in 1984 in Orlando. Caller ID followed voice mail, an invention created a decade before to make up for declining secretarial employment.

6 DVDs

Americans traded all those hours rewinding video cassettes for hours watching directors kibitz about behind-the-scenes antics with the introduction of digital video discs in 1995. Consumers spent \$7.4 billion on DVD rentals last year, up 10% from VHS rentals plummeted 74%, to \$281 million.



7 Lithium rechargeable batteries

How many AAs does it take to power a laptop? Almost no one knows, thanks to the durable rechargeable battery Sony brought to market in 1991. It made its debut in a Sony camcorder — and has provided juice for laptops, cellphones, digital cameras and other portable electronics ever since.



8 iPods

Walking down the sidewalk hasn't been the same since 2001, when Apple introduced its iconic portable digital music player. It wasn't the first player, but fans declared it the coolest and easiest to use by snapping up more than 100 million of them.



9 Pay at the pump

Filling up the tank became even more self-serve when a gas station chain in Abilene, Texas, invented technology that turned the pump into a quasi-ATM.

10 Lettuce in a bag

Americans discovered there's more to salad than iceberg lettuce drowning in bottled dressing after the rollout of mixed lettuce greens in a bag. Fresh Express in Salinas, Calif., made that possible by inventing a high-tech plastic bag introduced nationwide in 1989. That helped ignite a whole consumer category of portion-controlled foods, such as bagged baby carrots.



11 Digital cameras

Kodak unveiled a digital camera for professionals in 1986, when consumers were still getting millions of rolls of film processed in labs. Apple followed with the first consumer version eight years later. But it wasn't until this century that cameras got affordable, driving consumers to buy a forecast 30 million this year.



12 Doppler radar

We became a nation of weather fans as Doppler radar brought up-to-the-minute images to TV starting in 1990, a dozen years after the Weather Channel's launch turned forecasters such as Jim Cantore into celebrities.

14 Electronic tolls

Throwing quarters in a tollbooth bin became a thing of the past when the North Texas Tollway Authority started its TollTag system in the Dallas area in 1989. Now, millions of commuters prepay tolls and rely on electronic gadgets attached to their cars to zip through toll plazas.

15 PowerPoint

Lecturers from CEOs to sixth-graders display topic headings and charts with the click of a mouse. Forethought invented PowerPoint in 1987. Microsoft bought Forethought in 1987, unveiled it as Windows version 1.0 in 1990 and changed public speaking forever.

13 Flat-panel TVs

RCA pioneered flat-panel technology in the late 1960s. But it took nearly four decades before consumers got the idea. This year, 68% of digital TVs sold are forecast to come with flat panels.

16 Microwavable popcorn

We can credit — and blame — food scientists for simultaneously making possible lunch-in-a-hurry and that terrible burnt smell wafting from the office microwave oven. General Mills paved the way with the launch of Act II non-refrigerated microwavable popcorn in 1984.



17 High-tech footwear

Plain canvas sneakers got tossed to the back of the closet when Nike launched Air Jordans in 1985, followed by Reebok's The Pump in 1989, giving rise to the performance-footwear industry.

18 Online stock trading

Investors jettisoned pricey stockbrokers after an Ameritrade predecessor offered online stock trading in 1994. During the market run-up that followed, CNBC's Maria Bartiromo became a household name, and PCs morphed into slot machines for a new breed of investor: day traders.

19 Big Bertha golf clubs

A World War I cannon inspired one of the biggest golf innovations when Ely Callaway created the oversize, wide-bodied stainless steel wood he dubbed Big Bertha in 1991. Callaway Golf followed up with the Great Big Bertha, Biggest Big Bertha, Great Big Bertha II, Big Bertha 454 and today's Big Bertha 460.



20 Disposable contacts

A scream followed by, "No one move once routinely signaled that someone had dropped a pricey contact lens. Daily disposables — contacts worn for just a day before they're tossed — arrived in the USA in 1995.



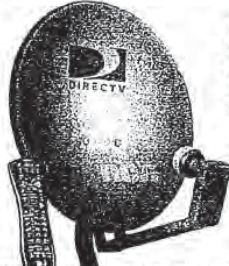
21 StairMaster

Arnold Schwarzenegger's breakout performance in Pumping Iron wasn't enough to get Americans pouring into gyms. Technology led the way with the StairMaster, one of the first machines to turn gyms into modern exercise arenas after it was introduced in Tulsa in 1986.



22 TiVo

The gadget is now a verb, with 4.4 million subscribers TiVo-ing their favorite TV shows. The digital device changed TV-viewing habits after the first TiVo was shipped in 1999.



23 Purell

Germs trembled, and parents rejoiced ("What in the world is that on your hands?") when Gojo in Akron, Ohio, created Purell hand sanitizer. The market for packaged wipes and towelettes took off amid health scares over flu and post-9/11 threats.

24 Home satellite TV

The dishes that receive signals were once so big and pricey, they'd pull down your house if you tried strapping them to the chimney. But the 1994 launch of service from DirecTV led to today's supercompact dishes and lower prices, beaming tonight's *Dancing with the Stars* to the USA's more remote places.

25 Karaoke

What makes you sound so very good singing *Stayin' Alive*? Two stiff drinks get you on stage in front of amused and horrified co-workers. But it's the karaoke machine invented in 1983 that really did the trick. The most popular karaoke song today? Patsy Cline's *Crazy*, says Karaoke.com.

Associated and written by USA TODAY's Karen Bernick, Jim Hagelma, Jeffrey Graham and Michelle Kessler. Design by Jim Kopp. USA TODAY Photo research by Soja Koster. USA TODAY Photos: Kevin S. Lamb, Bettmann, Callaway Golf, Consumer Electronics Association, Fresh Express, IDC, iStockphoto, Corel, iStockphoto, Gojo Industries, HomeBanc, National Weather Service, iStockphoto, The Wall Group, Visa USA, Calliphones photo by Frank Frazetta II. AP: ThinkPad laptop by IBM; Blackberry 930, 2001; iPod by Apple, 2001; gas pump by Jay Lurie; Bloomberg News; Canon digital camera by USA TODAY, 2004; flat-panel plasma TV by Hewlett-Packard, 2001; iPod by Apple, 2001; Callaway Golf's Big Bertha, 1998; award set by USA TODAY; Purell by Becton Dickinson; TiVo Inc., 2001; DirecTV, 2000.

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TiVo Joins the Collection of Nation's Most Influential Inventions

Posted by Admin on Wednesday, July 20, 2005 - 08:55 pm:

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United States Patent and Trademark Office Museum Honors Ideas That Improve Lives

ALVISO, Calif, July 20, 2005 - 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.

Designed to celebrate the nation's most influential inventions, "The Invention Machine: A Day in My Life" exhibit features everyday inventions that impact and improve people's daily lives, including the TiVo® digital video recorder (DVR) and the TiVo Service. The digital lifestyle that was launched by TiVo's creation has brought choice and control to the lives of millions of Americans.

"It is an honor for TiVo, and for me personally, to be placed in the US Patent and Trademark Office Museum ," said James Barton , Senior Vice President of Research and Development, Chief Technology Officer, and co-founder of TiVo Inc . "It isn't every day that an invention is embraced by millions of people. To be featured in such a terrific showcase is a great day for TiVo."

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 décor. 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. The video loop also highlights

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other patented aspects of TiVo's DVR and service, including novel ways of controlling live TV, TiVo's intuitive user interface and TiVo's award-winning remote control.

The USPTO Museum was designed and built by experts at Invent Now, a non-profit organization formed to recognize and encourage invention and creativity and curators of the National Inventor's Hall of Fame. "Our goal with the USPTO Museum was to create a fun, thought-provoking, and memorable experience. The TiVo exhibit is sure to be a favorite among guests," said Mitch Scott, Senior Designer for Invent Now. "We are showing visitors of all ages how imagination can be made real."

Ranging from interactive activities and touch-screen technology to artifacts and videos, the USPTO Museum provides a high-impact educational experience and is immediately visible to all those passing through the atrium of the United States Patent and Trademark Office. The new exhibit opened to the public on Wednesday, July 13, 2005 . More information is available at www.uspto.gov.

TiVo exhibit photos available upon request.

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[Admin](#)

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| Add images | Follow |
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**Tivo TCD652160 HD
Digital Video Recorder**
★★★★☆ (66 user ratings)
\$200 to \$302



**Tivo SERIES3 HD Digital
Media Recorder**
★★★★☆ (15 user ratings)
\$802



**Tivo Series2 TCD649080
Digital Video Recorder**
★★★★☆ (75 user ratings)
\$80 to \$160

Tivo TCD658000 HD Yi

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December 22, 2003

Greatest Invention, Period

Rick Reilly

The following is not a paid endorsement. The author received no gifts or services in exchange for this column. Not that he didn't try.

Please buy TiVo this holiday season. In fact, buy three.

I say this because if TiVo—greatest invention since beer—were ever to go broke, I would shrivel up into a lump of Limburger mold and die.

Why? Because when you own TiVo—greatest invention since Viagra—you kiss timeouts, huddles and 45-second close-ups of Andy Pettitte's eyebrows goodbye forever.

When you own TiVo—greatest invention since the thong—you instantly become the biggest enchilada in all of televised sports.

Who decides what time NFL games kick off? You. Who decides when replays and slo-mo will be shown? You. Who makes all sports commercial-free? You! Because with TiVo—greatest invention since Big Bertha—you become a human production truck.

With three buttons on the remote, you can record your team's entire season. Screw ESPN. You kick off games when you want. You can watch an entire nine-inning baseball game in the time it deserves: 17 minutes. You just fast-forward through the boring parts—and it's almost all boring parts. (Sorry, you won't get to sit there for 47 minutes as Nomar Garciaparra adjusts his cup.)

Thanks to TiVo—greatest invention since Halle Berry—your days of slogging through commercials are over. You say Michael Jordan has a new cologne? Smell ya later! Can you hear me now? Nope! They say you may have a problem-itch area? You don't care!

Do you realize how long it's been since I've heard one word uttered by a sideline football reporter? Two years! This means I've missed 1,086 breathless accounts by Dr. Jerry Punch, like, "Guys, I just talked to Coach Bowden. He told his team they've got to reduce the number of pulled groins this half. Back to you!"

TiVo is a digital video recording service (like top competitors ReplayTV and EchoStar). Your DVR receiver contains a hard drive that stores up to 80 hours of stuff and makes the VCR look as outdated as Fred Flintstone's blender. You don't need tapes, times or a Dartmouth engineering degree to program it. TiVo is so smart that it is constantly recording the last 30 minutes of whatever you're watching, even if you fall asleep and miss the only 30 seconds of the Dodgers' game that mattered. O.K., so TiVo costs about \$13 a month. You spend more than that on Altoids.

It's not just me. Joe Montana is a TiVotee. Tony Hawk flips for it. Kevin Gannett, John Elway, Ronnie Lott, Brett Bodine—they all gave unsolicited testimonials to TiVo! Normally, these guys won't burp for free!

TiVo is such a joy that even if a game is going on that I want to watch, I purposely won't watch it live. I'll rotate my tires or catch up on my Wally Cox video collection while TiVo records the game, then watch it without delays or interruptions as soon as it's over. Do you know how much fun it is to go, "Running play? Borrrring" and zap right through it?

Soon, you, too, will be using sentences like, "Well, I watched the Dolphins on one set, but I TiVoed the Braves on another." TiVo—greatest invention since chili-cheese fries—has been out only four years and already it's a verb!

Oh, and TiVo saves more than sports. It saves relationships.

Let's say you're a guy watching the sports report on the 10 o'clock news. You only get five minutes, right? Those five minutes are crucial to your emotional well-being and fantasy-league standings. And just as Biff Hairspray swings into the NBA scores, the wife comes up and

says, "Honey?"

And you do the standard guy trick, which is to turn your whole body toward the voice, while keeping your head facing the set. "You're not listening," she says.

"I am too," you say, nodding like a sanatorium inmate.

Not convinced, she says, "O.K., tomorrow, you'll have to go up to school and take Denise to the orthodontist and then drop her at her clarinet lesson...."

But of course you're enthralled with Timberwolves 102, Clippers 98. And this is what you hear instead: "O.K., tomorrow Kevin Garnett will have to go up and underdodontist and then drop four threes on her clarinet lesson...."

Then it hits you at about 1 a.m., in the middle of REM sleep, that you agreed to do something and have no idea what it is.

But with TiVo, the instant you hear, "Honey?" you immediately hit PAUSE on your TiVo, turn 100% of your body to your wife, look her right in the eye, smile more earnestly than Billy Graham and utter sweetly, "Yes, sugarplum?" And as long as she doesn't talk for more than 29 minutes, you're golden!

Now if TiVo could just bring this technology to real life. Roommate giving you long-winded recap of his Liza Minnelli dream? Fast-forward. Pop quiz in trig? Pause. Lava-hot girl just licked her lips at you at the pancake place? Save and replay at 2 a.m.

Telling you—greatest invention since the Barcalounger.

Find this article at:

<http://sportsillustrated.cnn.com/vault/article/magazine/MAG1030944/index.htm>

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Top Entertainment Invention of All Time: Tivo

- Published: Mon April 16th, 2007
- By: Alex Carter
- Category: Parenting

Is it possible for any other technological invention to surpass the Tivo for the label of top entertainment invention of all time? If you have ever had Tivo you already know what I am talking about, when you go to the home of someone without the gadget you cringe. You sit and ask yourself quietly, how did I live before Tivo? How was I able to watch my favorite shows with all of these mundane commercials blended in? Your friends don't even realize what they are missing, which is better for them I guess, it would help them sleep better at night. Sleep better realizing they are missing out on the top entertainment invention of all time.

As a longtime Tivo subscriber and #1 fan I have grown to appreciate my Tivo almost more than the television itself. When commercials are coming I can almost anticipate those three quick beeps that coming when I blaze through the latest, lamest, erectile dysfunction ads. When I return home from a long night of dinner and a movie with friends I am comforted to know that John Locke and the crew from *Lost* is waiting for me at the click of a button. Then again, I guess that all makes sense, because in a very real way my Tivo has helped find my way to entertainment bliss after I was lost. Oh, Tivo, you do find your way to my heart so delicately.

Let's put ourselves in a deeply hypothetical, yet very real scenario in which you are obligated to go to a family function and miss your favorite programming. Hypothetically, we will say that Nickelodeon is running a *Full House* marathon and you still haven't seen the really "sentimental" episode where Uncle Jesse's hair gets messed up. I'm sure Joey will make an insensitive, yet highly comical, statement about it that makes us all question our own presence on earth. You missed it because you were at Grandma's 80th birthday, unbelievable! Not if you have Tivo, because with Tivo you could also watch the other 79 episodes of the marathon, including the one where Danny likes to clean!

Tivo can now access your computer, meaning the possibilities have become endless for what Tivo can accomplish. You can access your pictures, read an important document, or surf the web right from the same spot where you watch reruns of *Chips*! Recently Tivo started piloting a program in parts of the country where subscribers can purchase and download movies from Amazon.com. This presents an interesting dilemma for people like me; now what reason do I have for getting up off of the couch? If Tivo figures out a way to make me dinner and allow me to use the restroom from my perch in the living room, I'll never move another muscle!

In all seriousness, Tivo can be claimed as the greatest entertainment invention ever simply because its ease of use. We all remember scrambling around the house to find a VHS tape to record the newest episode of *Alf* on our VCR, but Tivo makes it all very simple. As it continues to grow so will our fascination with the entertainment industry, but perhaps so will our ability to relax and enjoy the simple things as they happen. After all, it is a lot easier to enjoy little Billy's baseball game when you know that *Dancing with the Stars* is being recorded by the ever-reliable Tivo, right?

Comments

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FCC's Chief Calls TiVo 'God's Machine'

By Jim Krane
AP Technology Writer
Saturday, January 11, 2003; 2:02 AM
<http://www.washingtonpost.com/wp-dyn/articles/A41345-2003Jan11.html>

LAS VEGAS The chairman of the Federal Communications Commission is a new convert to the personal digital video recorder.

"My favorite product that I got for Christmas is TiVo," FCC chairman Michael Powell said during a question and answer session at the International Consumer Electronics Show. "TiVo is God's machine."

If Powell's enthusiasm for digital recordings of TV broadcasts is reflected in FCC rulings, the entertainment industry could have a tough time pushing its agenda in Washington. It wants restrictions on making and sharing the recordings.

Powell said he plans to use TiVo to record shows to play on other TV sets in his home, and suggested he might share recordings with his sister if she misses a show.

Powell made the statements during a brief exchange with Gary Shapiro, who heads the Consumer Electronics Association, a lobbying group opposed to government-imposed restrictions on TiVo-like digital recording technology.

Shapiro was clearly delighted, calling Powell's statement "good news" and suggesting to Powell that his regulatory authority might allow him to rule in favor of sharing recorded TV broadcasts.

"That's up to you, actually," Shapiro said. "We're glad. We hope some of your colleagues in Congress buy a TiVo as well."

Many in Hollywood have railed against the machines, saying they could cut into TV advertising revenues. TiVo can remove commercials before viewing.

The entertainment industry has proposed "broadcast flag" technology that could thwart or limit copying or distribution of pirated broadcasts over the Internet. Many in the industry fear the broadcasts could be sold online.

Powell said the FCC was examining the broadcast flag issue to determine whether the agency has a regulatory role. He suggested Congress might "assign us a role so we have clear jurisdiction and resources to do it."

A TiVo competitor, SONICblue, has been sued by motion picture studios and television networks over a ReplayTV device that enables users to share digitally recorded shows over the Internet with a limited group of fellow ReplayTV owners.

Powell said he understood the need to balance the interests of consumers with those of Hollywood and broadcasters.

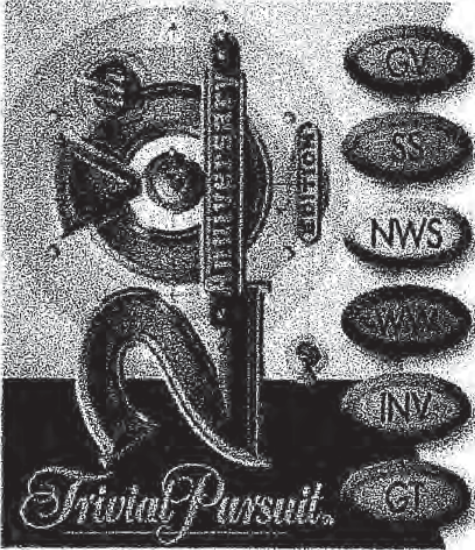
One upcoming TV series plans to fight commercial skipping technology by blending advertising into its programming, offering a seamless hour of entertainment mixed with salesmanship.

The series will air for six weeks on the WB network. The show, with the working title, "Live from Tomorrow," will be produced by Michael Davies, best-known for ABC's "Who Wants to be a Millionaire," according to a story Friday in The New York Times.

Can you answer the green question?

| | |
|-----|---|
| GV | • What natural disaster is a <i>hainuco</i> if it's lumpy, and a <i>llapana</i> if it's smooth, to a Peruvian? |
| SS | • What group smashed 'N Sync's record for most CD sales in a week, in 2000? |
| NWS | • What city's Christmas displays were vandalized in November 2000, by a group charging 14 merchants with lacking "savoir vivre"? |
| VVV | • What famous Dutch painter is a main character in the novel <i>Girl with a Pearl Earring</i> ? |
| INV | • What digital video recording system did <i>Esquire</i> call the "best thing to happen to TV since the cancellation of <i>The Tony Danza Show</i> "? |
| GI | • What tennis star skipped Wimbledon from 1988 to 1990, claiming an aversion to wearing white? |

77

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|---|-----|--------------|
|  | GV | A mudslide |
| | SS | The Beatles |
| | NWS | Montréal's |
| | VVV | Vermeer |
| | INV | TiVo |
| | GI | Andre Agassi |

77

Crossword

Edited by Will Shortz

PUZZLE BY DANIEL RAYMON

ACROSS

1 Tempest

3 Those in Mexico

10 Mimicked

14 Energetic almost to a fault

15 Save for later viewing

16 As a result

17 "___ my case"

18 Nile queen, informally

19 "Seeing red" feeling

20 Pride in Alaska?

22 2008 film about a hunchbacked lab assistant

23 Leader overthrown in 1917

24 Mrs. Truman

26 Prudy for one

28 Opened a bid

29 W.W. II general

30 Lawyers' go

33 Computer character, for short

35 Spurred dish California?

38 Take a nap, then go to the office

39 Chair name

42 Pawns

43 Easter egg coloring

44 Gov. Landon, who lost to F.D.R.

45 Film figure with fangs, for short

47 Aphorism

49 Leaping insect

51 Kit (candy bars)

53 Butter servings

57 Scream in Alabama?

59 Prefix with lateral

60 Pop singer Birkell

61 Multitude

62 Pair of "Knocked Up"

63 Bad people may wear them

64 Singer John

65 Tim Diddy

66 "___ Show" of the 1980s

68 Nicole opening

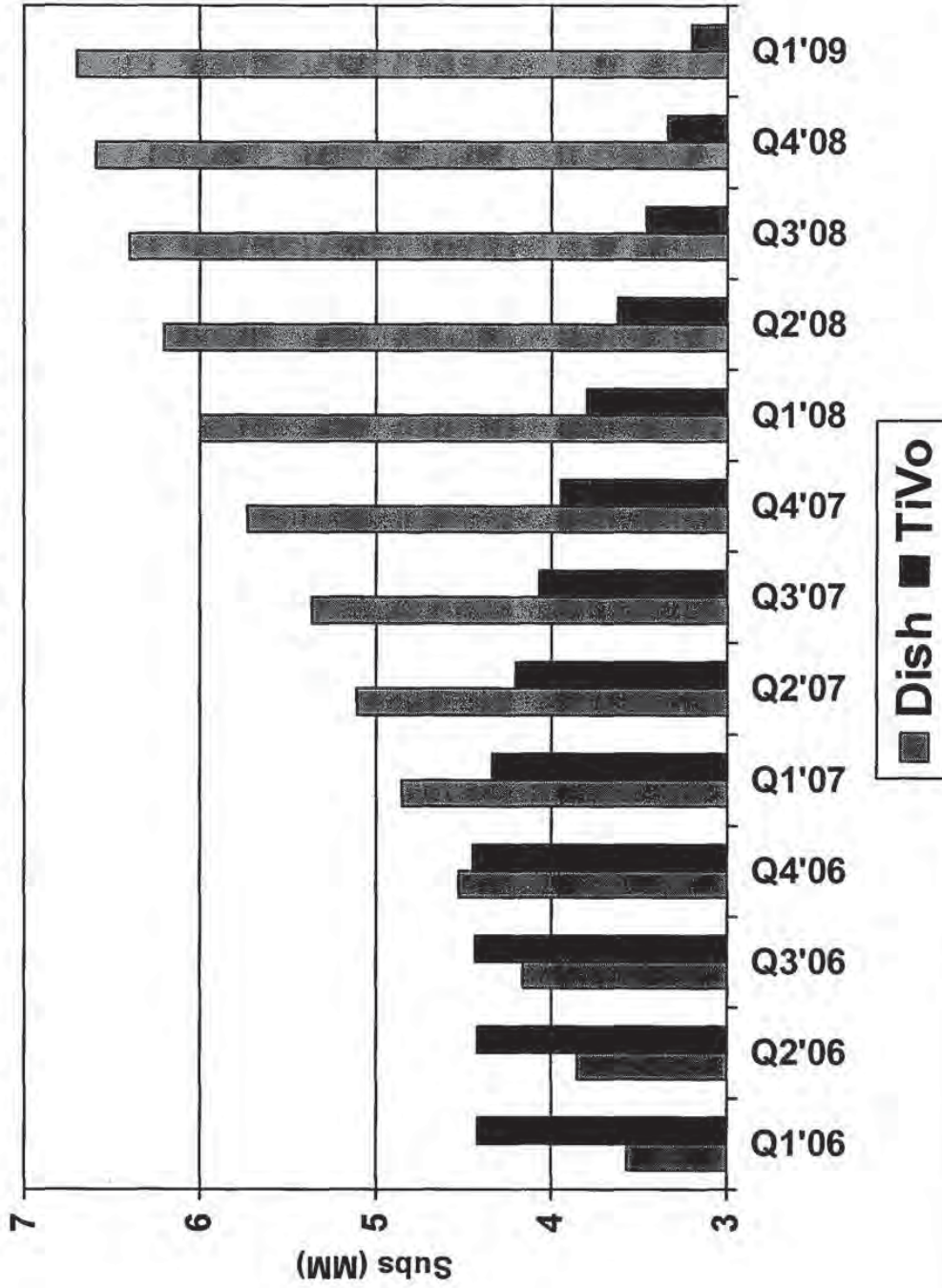
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ANSWERS TO PREVIOUS PUZZLE

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TiVo vs. DISH DVR Subscribers Since 2006



Electronic Acknowledgement Receipt

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| EFS ID: | 6377364 |
| 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 |
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| Amendment/Req. Reconsideration-After Non-Final Reject | 2 | 2 |
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| Applicant summary of interview with examiner | 6 | 6 |
| Applicant Arguments/Remarks Made in an Amendment | 7 | 45 |
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November 2, 2009

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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: 2513.002REX0

Sir:

Transmitted herewith for appropriate action is the following document:

1. Reply to Office Action in *Ex Parte* Reexamination and Statement of Substance of Interview under 37 C.F.R. § 1.560;
2. Certification of Service of Reply to Office Action and Statement of Substance of Interview;
3. Declaration of John D. Villasenor under 37 C.F.R. § 1.132 (Appendix A); and
4. Secondary Considerations Declaration under 37 C.F.R. § 1.132 (Appendix B), with Exhibits 1-21.

The above-listed document is filed electronically through EFS-Web.

Fee payment is provided through online credit card payment. 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. 25,688

EJK/LAG:mlb
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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 | 1 | Attorney Docket Number | 2513.002REXO |

| 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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| | US36 | 5,815,671 | 09-29-1998 | Morrison | |
| | US37 | 6,330,334 | 12-11-2001 | Ryan | |
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| 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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| Examiner Signature | | Date Considered | |
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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 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 INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER (Use as many sheets as necessary) | | | | <i>Complete if Known</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 | |

| 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 |
| | NPL49 | U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, TiVo Inc. v. Echostar Communications Corp. et al., Brief of Defendants-Appellants, July 17, 2009. | |
| | NPL50 | U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT, TiVo Inc. v. Echostar Communications Corp. et al., 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 Signature | Date Considered |
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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.
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|---|--------------------------------|
| EFS ID: | 6588990 |
| 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 |
| Filer Authorized By: | |
| Attorney Docket Number: | 2513.002REX0 |
| Receipt Date: | 07-DEC-2009 |
| Filing Date: | 10-NOV-2008 |
| Time Stamp: | 19:47:07 |
| Application Type: | Reexam (Third Party) |

Payment information:

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| Submitted with Payment | no |
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File Listing:

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| Transmittal Letter | | | 2 | 3 | |
| Reexam Certificate of Service | | | 4 | 4 | |
| Information Disclosure Statement (IDS) Filed (SB/08) | | | 5 | 6 | |
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| Information: | | | | | |
| 6 | NPL Documents | NPL49_Brief_of_Defendants.pdf | 14214859 | no | 139 |
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| 7 | NPL Documents | NPL50_Brief_of_Tivo.pdf | 535073 | no | 70 |
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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

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re Reexam of U.S. Patent No.: 6,233,389 | Confirmation No.: 2859 |
| BARTON <i>et al.</i> | Art Unit: 3992 |
| Reexam Control No.: 90/009,329 | Examiner: Fred O. Ferris, III |
| Filed: November 10, 2008 | Atty. Docket: 2513.002REX0 |
| For: Multimedia Time Warping System | |

Information Disclosure Statement

Mail Stop Ex Parte Reexam

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

Sir:

Listed on accompanying IDS Form are documents that may be considered material to the examination of this application, in compliance with the duty of disclosure requirements of 37 C.F.R. §§ 1.555 and 1.98.

The Patent Owner has listed a publication date on the attached IDS Form based on information presently available to the undersigned. However, the listed publication date should not be construed as an admission that the information was actually published on the date indicated.

The 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 statement should not be construed as a representation that a search has been made, or that information more material to the examination of the present patent

BARTON *et al.*
Reexam of Patent No. 6,233,389
Reexam Control No. 90/009,329
Atty. Docket: 2513.002REX0

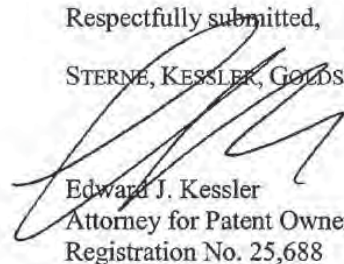
application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

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 proceeding that the documents have been considered.

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. 25,688

Date: December 7, 2009
1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

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| Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY PATENT OWNER <i>(Use as many sheets as necessary)</i> | | | | <i>Complete if Known</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 | |

| 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 |
| | 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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| Examiner Signature | | Date Considered | |
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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.
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| EFS ID: | 7081249 |
| 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/Maya Bennett |
| Filer Authorized By: | Lori Ann Gordon |
| Attorney Docket Number: | 2513.002REX0 |
| Receipt Date: | 24-FEB-2010 |
| Filing Date: | 10-NOV-2008 |
| Time Stamp: | 17:33:06 |
| Application Type: | Reexam (Patent Owner) |

Payment information:

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| 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.) |
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| Reexam Certificate of Service | 4 | 4 | |
| Information Disclosure Statement (IDS) Filed (SB/08) | 5 | 6 | |

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| 2 | NPL Documents | 2513002REX0npl55.pdf | 409156 | no | 12 |
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New Applications Under 35 U.S.C. 111

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

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New International Application Filed with the USPTO as a Receiving Office

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | |
|--|-------------------------------|
| In re Reexam of U.S. Patent No.: 6,233,389 | Confirmation No.: 2859 |
| BARTON <i>et al.</i> | Art Unit: 3992 |
| Reexam Control No.: 90/009,329 | Examiner: Fred O. Ferris, III |
| Filed: November 10, 2008 | Atty. Docket: 2513.002REX0 |
| For: Multimedia Time Warping System | |

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

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BARTON *et al.*
Reexam of Patent No. 6,233,389
Reexam Control No. 90/009,329
Atty. Docket: 2513.002REX0

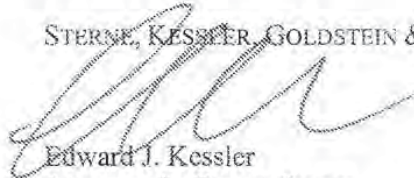
application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

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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. 25,688


Date: February 25, 2010
1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

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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 | 1 | 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 |
| | 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. | |
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| EFS ID: | 7175709 |
| 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: | 09-MAR-2010 |
| Filing Date: | 10-NOV-2008 |
| Time Stamp: | 20:16:42 |
| Application Type: | Reexam (Patent Owner) |

Payment information:

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| Reexam Certificate of Service | 5 | 5 | |

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| 2 | NPL Documents | 2513002REX0_NPL56.pdf | 206303 | no | 36 |
| | | | #8e775bd187e6e45df898ad66af8b5d194923b72 | | |

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| Total Files Size (in bytes): | 563664 |
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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 Reexam of U.S. Patent No.: 6,233,389 | Confirmation No.: 2859 |
| BARTON <i>et al.</i> | Art Unit: 3992 |
| Reexam Control No.: 90/009,329 | Examiner: Fred O. Ferris, III |
| Filed: November 10, 2008 | Atty. Docket: 2513.002REX0 |
| For: Multimedia Time Warping System | |

Information Disclosure Statement

Mail Stop Ex Parte Reexam

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

Sir:

Listed on accompanying IDS Form is a document that may be considered material to the examination of this application, in compliance with the duty of disclosure requirements of 37 C.F.R. §§ 1.555 and 1.98.

The Patent Owner has listed a publication date on the attached IDS Form based on information presently available to the undersigned. However, the listed publication date should not be construed as an admission that the information was actually published on the date indicated.

The 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 statement should not be construed as a representation that a search has been made, or that information more material to the examination of the present patent

BARTON *et al.*
Reexam of Patent No. 6,233,389
Reexam Control No. 90/009,329
Atty. Docket: 2513.002REX0

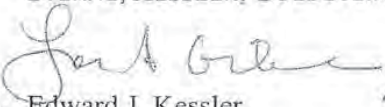
application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

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 proceeding that the listed document has been considered.

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. 25,688

Date: March 9, 2010
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April 8, 2010

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Commissioner for Patents
 PO Box 1450
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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: 2513.002REX0

Sir:

Transmitted herewith for appropriate action is the following document:

1. Supplemental Reply to Office Action in *Ex Parte* Reexamination;
2. Certification of Service of Supplemental Reply to Office Action; and
3. Online Credit Card Payment Authorization for \$416.00 to cover excess total claims (8) fee.

The above-listed document is filed electronically through EFS-Web.

Fee payment is provided through online credit card payment. 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. 25,688

EJK/LAG:mlb
 Enclosures
 1100814_LDOC

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re reexam of:
U.S. Patent 6,233,389

Reexam Control No.: 90/009,329

Filed: November 10, 2008

For: **Multimedia Time Warping System**

Confirmation No.: 2859

Art Unit: 3992

Examiner: FERRIS, Frederick

Atty.Docket: 2513.002REX0

Supplemental Reply to Office Action in *Ex Parte* Reexamination

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

Sir:

Further to Patent Owner's Reply to the Office Action in *Ex Parte* Reexamination filed on November 2, 2009, the Patent Owner, TiVo Inc. (hereafter "TiVo") submits this Supplemental Reply.

It is not believed that extensions of time beyond those already requested and granted or other fees are required. However, if any fees are necessary to prevent abandonment of this application, then such fees are hereby petitioned and hereby authorized to be charged to our Deposit Account No. 19-0036.

Amendments to the Patent Claims

Claims Undergoing Examination:

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 playback 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.

Please insert new claims 62-69 as follows:

62. (New) The process of claim 31, wherein the storing and retrieving of said data streams onto and from said storage device are performed simultaneously.

63. (New) The process of claim 62, wherein said transform object stores data streams for one program onto said storage device and simultaneously retrieves data streams for another program from said storage device.

64. (New) The process of claim 31, wherein said transform object retrieves from said storage device a first set of data streams for a first program that are converted to first display signals that are provided to a first external device, and simultaneously retrieves a second set of data streams for a second program that are converted to second display signals that are provided to a second external device.

65. (New) The process of claim 64, wherein said flow command events cause a rewind of said first program and a rewind of said second program.

66. (New) The apparatus of claim 61, wherein said transform object is configured to store and retrieve said data streams onto and from said storage device simultaneously.

67. (New) The apparatus of claim 66, wherein said transform object is configured to store data streams for one program onto said storage device and simultaneously retrieve data streams for another program from said storage device.

68. (New) The apparatus of claim 61, wherein said transform object is configured to retrieve from said storage device a first set of data streams for a first program that are converted to first display signals that are provided to a first external device, and simultaneously to retrieve a second set of data streams for a second program that are converted to second display signals that are provided to a second external device.

69. (New) The process of claim 68, wherein said flow command events cause a rewind of said first program and a rewind of said second program.

Remarks

This Supplemental Amendment and Reply submitted by the Patent Owner, TiVo Inc. (hereinafter "TiVo" or "Patent Owner"), supplements its Patent Owner's Reply to Office Action filed on November 2, 2009.

In this Supplemental Amendment and Reply, Patent Owner proposes to add new claims 62-69. Support for proposed new claims 62-69 can be found, for example, at 1:65-2:3, 3:20-29, 4:14-22, and FIG. 2 of the patent under reexamination, U.S. Patent No. 6,233,389 ("the '389 patent"). These changes do not enlarge the scope of the claims of the patent or introduce new matter and their entry is therefore respectfully requested.

This Supplemental Amendment and Reply may be entered by the Examiner pursuant to 37 C.F.R. § 1.111 (a)(2) ("Rule 111(a)(2)"). Entry of the new claims could form the basis for allowable subject matter should the Examiner find claims 31 and/or 61 to be unpatentable over the applied references. In addition to the arguments presented in Patent Owner's previous response in support of the patentability of claims 31 and 61, neither of these references teaches or suggests the specific features recited in the new claims when considered in combination with the features recited in independent claims 31 and 61. The Patent Owner therefore respectfully requests that the Office enter and consider this Supplemental Reply.

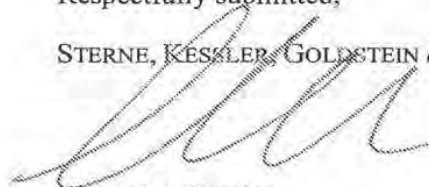
Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. The Patent Owner therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. The Patent Owner believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present reexamination proceeding is in condition for a Notice of Intent to Issue a Reexamination Certificate. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Supplemental Amendment and Reply is respectfully requested.

Respectfully submitted,

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



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

Date: April 8, 2010

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Barton
Reexam of Pat. No. 6,233,389
Reexam Control No.: 90/009,329

Patent Under Reexamination: 6,233,389
Reexamination Control No.: 90/009,329
Examiner: FERRIS, Frederick
Art Unit: 3992

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

Sir:

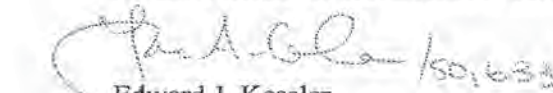
**CERTIFICATION OF SERVICE OF REPLY TO OFFICE ACTION AND
STATEMENT OF SUBSTANCE OF INTERVIEW**

In compliance with 37 C.F.R. § 1.550(f), the undersigned, on behalf of the patent owner, hereby certifies that a copy of this paper has been served on the third-party requester by first class mail on April 8, 2010. The name and address of the party served is as follows:

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

Respectfully submitted,

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


Edward J. Kessler
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Date: April 8, 2010

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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: | Lori Ann Gordon/Kim Perry |
| 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: | | | | |
| Reexamination claims in excess of 20 | 1822 | 8 | 52 | 416 |

Miscellaneous-Filing:

Petition:

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 (\$) | | | | 416 |