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OUR REF. AMH/plc/PL75109EP

YOUR REF.

9 February 1996

European Patent Office
Directorate General 2
D-80298 Munich
Germany

VIA FACSIMILE

Dear Sirs

Re: European Patent Application No. 90902741.9-2202
LANG, Richard A.

Response to the Official Communication dated 30 June 1995 is filed herewith. The extension of time granted for filing the response is appreciated.

Should there be any queries which could usfully be dealt with by telephone, the examiner is invited to contact the applicant's representative. Simply by way of precaution it is requested that an opportunity to request oral proceedings be given before any decision to reject the application is made.

Yours faithfully
W P Thompson & Co

HECTOR, Annabel Mary
Professional Representative
Association No. 105

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See p. 182

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Application No. 90902741.9
Response to Communication pursuant to Article 96(2) and Rule 51(2) EPC

Replacement pages 1, 2, 2a, 3, 5, 7, 8, 11 and 20 of the description are filed herewith in triplicate, together with triplicate copies of a replacement set of claims on pages 1 to 34.

The claims have been amended in response to paragraph 1(a) of the Communication, to improve their clarity. It is submitted that it is now clear that the claims relate to the data compression as described on page 7 of the description. Furthermore, claims 50 and 105 have been amended to be dependent upon claims 1 and 66 respectively as required in paragraph 2. In addition, the description has been amended to correct the formal objections under section 5 of the Official Communication dated 22 April 1995, and to delete the sub-headings. However, regarding paragraph (b) of that section, the claims have not been put into two-part form since it is believed that this would necessitate substantial changes to the wording which would result in the claims lacking clarity.

Regarding paragraph 1(b) of the present Communication, digital audio/video source information received at the input means is converted to corresponding analog audio/video source information to permit real time viewing of the received digital source information on an external conventional analog television monitor at the same time that it is being compressed and stored within the audio/video transceiver apparatus (see for example page 17, penultimate paragraph).

Regarding paragraph 1(c), regardless of the data transfer rate of the CD-player of D1, this document does not disclose or suggest the compression of the data now claimed. On the contrary, D1 discloses at page 840, section 4.2 that the maximum data transfer rate of 150 kilobytes/second from the CD player to the CD-RAM results in the complete transfer of a single frame of video information in 5.4 seconds. Thus, using the apparatus of document D1 to transfer a 2-hour video program at the television frame rate of 30 frames per second would require the transfer of 216,000 individual frames at 5.4 seconds per frame for a total transfer time of 1,166,400 seconds or 324 hours. In contrast, the invention as now claimed transmits video information in a burst transmission time period that is shorter than the time period required for real time viewing of that video information. Thus, referring to section 4, it is submitted that the invention as now claimed is more clearly distinguished from the cited documents. In particular nothing in D2 would suggest that video source information could be transmitted in the compressed from as now claimed.

Regarding paragraph 3 of the Communication, it is submitted that the objections in sections 1 and 2 are obviated by the amendments to the claims now filed.

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Fig. C141

AUDIO/VIDEO RECORDER/TRANSCEIVER

RICHARD A. LANG

~~BACKGROUND OF THE INVENTION~~

The video cassette recorder (VCR) has added significantly to the usefulness of the home television set. Important or exceptionally good programs may be recorded to be viewed again. Programs appearing at times that are inconvenient for viewing may be recorded for playback at a later time. Recorded movies or other materials, educational or entertaining, may be rented or borrowed for viewing at home. (As used in the remainder of this specification, the term "program" encompasses movies and other types of video and/or audio materials, whether broadcast from a TV station or another source.)

The typical VCR has its own tuner-receiver and a video-recorder. It can receive and record a program from one channel while the television set is being employed to view a program on another channel. Programs are recorded on magnetic tape. The tape is then played back and viewed on the television set. Features commonly included in the VCR are capabilities for advancing the tape forward or backward at a high speed, stopping motion at any frame to hold the image, or simply playing back the recording at normal speed.

Desirable features that are not normally available in a VCR are capabilities for copying recorded programs from one tape or alternative storage medium to a similar or dissimilar storage medium, editing recorded programs and high speed recording. Another desirable, but currently unavailable, feature is the capability for high speed, high quality transmission and reception by optical fiber, microwave or other communications means using the VCR.

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It is known to store and transmit still images from a CD player to a CD-RAM (see for example I.E.E.E. Transactions on Consumer Electronics "1988 International Conference on Consumer Electronics, Part 1", 34 (1988) August, No.3, New York, US, pages 838-845; Hildering et al.: "Programmable Compact Disk Picture Memory and Video Processing System"). EP-A-0283727 discloses an electronic music centre for producing a custom audio tape by permitting the user to make selections from a music library and to duplicate these selections at high speed on a blank recording tape.

According to the present invention, there is provided an audio/video transceiver apparatus comprising: input means for receiving audio/video source information; compression means, coupled to said input means, for compressing said audio/video source information into a compressed representation thereof which is capable of being transmitted in a time compressed from having an associated burst transmission time period that is shorter than a time period associated with real time viewing of said audio/video source information; storage means, coupled to said compression means, for storing the compressed representation of said audio/video source information; and output means, coupled to said storage means, for receiving the compressed audio/video source information stored in said storage means and for transmitting said compressed representation of said audio/video source information away from said audio/video transceiver apparatus in said burst transmission time period.

In one embodiment, the video program is received via a fibre optic port, a microwave transceiver, an RF receiver, or other input means. The video signal is typically a digital compressed video signal which may be provided by another transceiver device in accordance with the invention or a centrally located video

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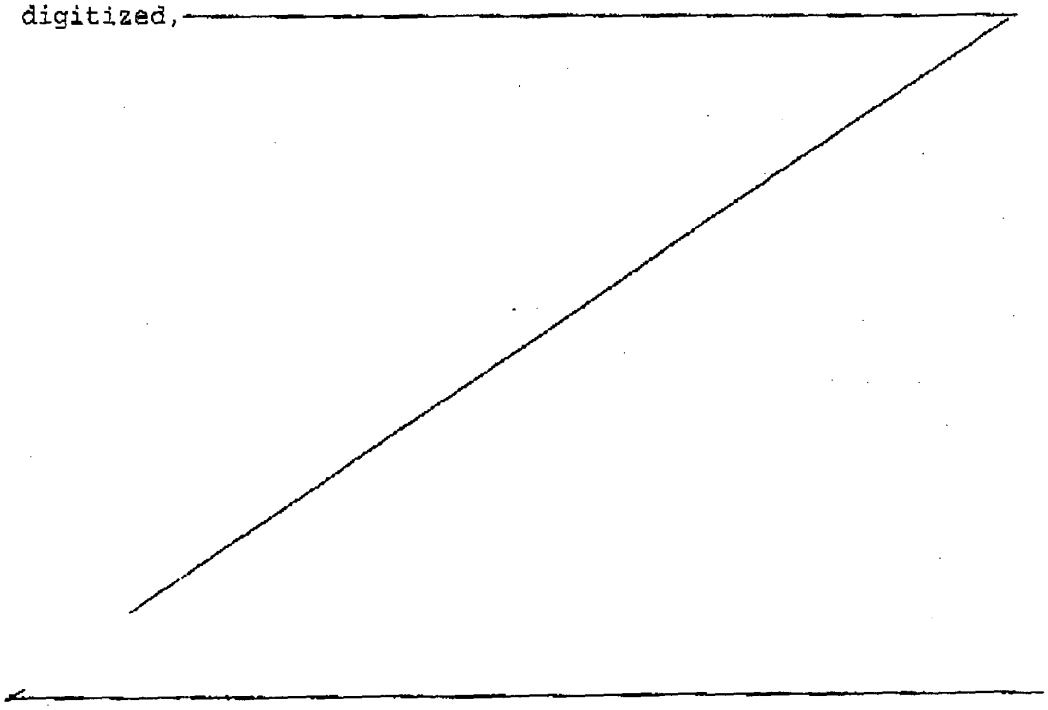
The transceiver apparatus may comprise a video recording device which typically includes an editor for editing the digital compressed video signal stored in memory.

The transceiver device may include compression/decompression circuitry for decompressing a compressed digital video signal and converting the decompressed digital video signal to an analog signal for subsequent viewing. In one embodiment, the transceiver device also includes a second memory (which can be, for example, a magnetic tape cassette, optical disc, or other recording media) for receiving the decompressed analog video signal for subsequent viewing.

In another embodiment, the transceiver device includes input means for receiving a video signal at conventional speeds, such as an RF tuner used to receive conventional analog video signals, a camera input line for receiving an input signal from a TV camera, or other type of input means. The signal received by this input means can be stored in the second memory, and/or digitized,



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compressed and stored in the first memory, and/or viewed on a television monitor.

In another embodiment, the ~~video recording~~ transceiver device can receive digital video signals at conventional speeds as well.

These and other advantages of my invention are better understood with reference to the drawings and detailed description below.

~~BRIEF DESCRIPTION OF THE DRAWINGS~~

Fig. 1 is a perspective view of the housing of the audio/video recorder editor/transceiver ("VCR-ET") disclosed and embodying the invention.

Fig. 1A is an enlarged view of the circled area of Fig. 1.

Fig. 2 is a functional block diagram of the VCR-ET of Fig. 1.

Fig. 2A is a functional block diagram of the VCR-ET of Fig. 1 including circuitry for demodulating a video signal encoded using the Vokac technique.

Fig. 3 is a functional block diagram of a VCR-ET in accordance with another embodiment of the invention.

Fig. 4 is a functional block diagram of an audio recorder/transceiver constructed in accordance with the invention.

Fig. 5 illustrates a plurality of VCR-ET's adapted to receive video signals from a remotely located video library via a common communication channel.

Fig. 6 illustrates a carrier signal modulated using the Vokac modulation technique, described in greater detail below.

~~DESCRIPTION OF THE PREFERRED EMBODIMENT~~

Referring to the drawing by reference characters, Figs. 1 and 2 illustrate an improved audio/video recorder

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used to change the magnetic or optical properties of the media. A lower-powered laser is then used to read the data from the disc. Data, in this case, is permanently recorded; it may neither be erased nor written over. A further description of this technology can be found in the November 1988 issue of The Electronic System Design magazine (ESD) pages 55-56 ~~, incorporated herein by reference~~.

A second and preferred type of optical disc to be used in AVRU 11 is an erasable optical disc. This disc has full read/write/erase capabilities. With this disc, AVRU 11 has the same record/playback capabilities as a conventional VCR. As an example, erasable optical discs are used in Steven Jobs' "Next" machine as described in Infoworld, Volume 10, issue 42, pages 51 and 93, October 17, 1988 ~~, incorporated herein by reference~~. In addition, the random access capabilities of the erasable disc (and of the CD-ROM and WORM) provide additional benefits as will be discussed in a later part of this specification.

A key element of VCR-ET 10, which is partly responsible for its improved functionality, is the video control unit or VCU 12. The VCU comprises an analog to digital converter (ADC) 24, a digital to analog converter (DAC) 25, a compressor/decompressor 26, a controller 27, a central processing unit (CPU) 28 and a random access memory (RAM) 29. VCU 12, using these elements, accomplishes the digitization and compression of analog signals as well as the reverse process in which the compressed digital signals are decompressed and converted back to analog signals.

As a first step in the processing of the composite video signals within VCU 12, the sync signals are decoded to isolate signals for each picture frame for processing.

The video signals defining each frame may then be

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devices appropriate for this function are described in an article by K. Rogers entitled "8-bit A/D Flash Hits 500 Msamples", Electronic Engineering Times, Dec. 12, 1988, page 90~~, incorporated herein by reference~~.

Compression of the digital data defining a video frame and the reverse process (decompression) are accomplished by compressor/decompressor 26. Various algorithms may be employed in the compression process which enable the representation of a series of numbers by a reduced number of digits. As an example, compression algorithms like CCITT Group IV may be used.

In one optional embodiment, to further reduce the amount of memory required to store a program, the compression algorithm can simply record data corresponding to only those pixels which change color from one frame to the next. This results in considerable memory space savings, since not all pixels change color each frame. Basing calculation upon 10% of the pixels changing from one frame to the next, it is estimated that memory requirements using this technique are cut by about 90%. It is also estimated that on the average, the CCITT Group IV algorithm can cut memory requirements by another 95%. Thus, if no data compression technique is used, it would take approximately 51.03 gigabytes to store a 2 hour video program, but by using the above compression techniques, it is estimated that memory 13 will require only 250 megabytes.

Controller 27 handles timing and aids in the communication between the different elements of VCU 12, and between VCU 12, AVRU 11 and memory 13.

In one embodiment, the audio portion of the program is periodically sampled and digitized by analog to digital conversion. In one embodiment, this is done at a sample rate of 88,000/second, one byte per sample, to yield compact disc quality sound. The sampling rate could be

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dropped to reduce memory requirements. Also, the audio data can be compressed with conventional algorithms.

The process of converting either from analog to digital or from digital to analog requires memory for intermediate storage. Random Access Memory (RAM) 29 serves in this capacity. For this purpose either a DRAM (Dynamic RAM) or a SRAM (static RAM) may be employed. An example of a DRAM is the TI (Texas Instruments) TMX4C1024; an example of a SRAM is the INMOS IMS-1203. RAM 29 should have sufficient capacity to store at least two full uncompressed frames (e.g., about 472 KB).

The CPU (Central Processing Unit) 28 is a microprocessor which controls the digitization process of VCU 12. CPU 28 works with controller 27 to control and communicate with the other elements of the VCU. There are numerous commercially available microprocessors that are appropriate for this application. The Intel 80286, Intel 80386, Motorola 68020, and Motorola 68030 are examples. A more complete description of the microprocessors can be found in the October 27, 1988 issue of Electronic Design News (EDN), pages 231 and 242, ~~incorporated herein by reference~~, or in the applicable data sheets.

Controller 27, CPU 28 and RAM 29 serve in the same manner during the reverse processes, i.e., decompression and digital to analog conversion. Decompression is first accomplished in compressor/decompressor 26. The decompressed digital signal is then converted to an analog signal by digital to analog converter (DAC) 24 (assuming its destination requires an analog form). In the course of converting the decompressed signals from the VCU 12 for use by the AVRU 11 the signals are synchronized by the time base generator (TBG) or corrector 48. TBG generator 48 inserts synchronization pulses into the signal provided by VCU 12 to identify individual raster scan lines and frames so that the resulting signal can be used by a

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wherein said monitor means is operative for enabling the user to view the selectively decompressed ~~time~~ compressed representation of said audio/video source information stored on said removable recording medium.

33. An apparatus as claimed in claim 31 comprising external video tape recorder means, coupled to said output means, for storing the selectively decompressed ~~time~~ compressed representation of said audio/video source information onto magnetic tape.

34. An apparatus as claimed in claim 1 comprising recording means, including a removable recording medium, coupled to said ~~random access~~ storage means, for storing the ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means onto said removable recording medium.

35. An apparatus as claimed in claim 1 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means; and

recording means, including a removable recording medium, coupled to said decompression means, for storing the selectively decompressed ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means.

36. An apparatus as claimed in claim 1 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the ~~time~~ compressed representation

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requirements. Examples of suitable data bus devices are Motorola's VME bus, Intel's Multibus and the Optobuss (U.S. Patent 4,732,446).

A video line or camera input line 15 is provided to enable VCR-ET 10 to receive an input signal from a source such as a television camera, a conventional VCR, a television tuner, or another VCR-ET, etc. The signals received at input line 15 are typically carried by a coaxial cable and are in the form of a standard television composite signal. As used throughout this specification, the words "standard television composite signal" or its acronym STCS shall be read to include any one of the following: NTSC, PAL, SECAM, HDTV, or any American or European broadcast signal standards. (NTSC, PAL and SECAM are discussed in "Reference Data for Radio Engineers", published by Howard W. Sams & Co. in 1983[~~, incorporated herein by reference~~].) An NTSC composite signal is defined as the analog signal that carries the chrominance (color), luminance (brightness), synchronization (timing) and audio signals that make up the video signals received and displayed by television and video cassette recorders. These four components are combined into one signal by modulating the components in different ways. (Amplitude modulation and phase modulation are examples.) The standard video line signal is such a composite signal and may be received at input line 15 from one of the above-mentioned sources.

TV RF tuner input port 16 also supplies a composite signal as described in regard to video input line 15. The difference is that this signal is received from an antenna or cable TV coaxial cable. To receive such a signal, tuner 16 is capable of being set or tuned to receive the desired carrier frequency or television channel.

Selector switch 35 is provided to select either video input line 15 or TV RF tuner 16 as an input signal source

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a plurality of subscribers request the same film, the library broadcasts a signal preamble containing the plurality of subscribers' codes corresponding to the VCR-ET's of each subscribing VCR-ET owner who requested that film, so that each requesting subscriber simultaneously receives the requested film. In one embodiment, the VCR library prioritizes the order in which films are broadcast based upon the number of subscribers requesting each film.

In another embodiment, a plurality of VCR-ET's are coupled via their optical fiber port 18 and a common optical fiber to the video library. In yet another embodiment, instead of receiving signals from the video library using microwaves or optical signals, such video signals are received via radio waves of a frequency such as are used to communicate conventional television signals. In one such embodiment, these radio wave signals are modulated using a technique described in U.S. patent 4,613,974, issued to Vokac et al. on September 23, 1986 ~~and incorporated herein by reference~~. In the Vokac modulation technique, the sine waves that make up the radio signals are modified to include what Vokac refers to as "audel levels" i.e. a relatively flat signal portion 110 between the peaks 112 and troughs 114 of the sine waves (see Figure 6). In one embodiment, TV RF tuner 16 is coupled to Vokac demodulation circuitry 16 (Fig. 2A) which is capable of demodulating signals encoded using Vokac's technique, and downloading these signals via lead 94 to memory 13.

The use of Vokac's technique in this embodiment is important because Vokac's technique allows for a single carrier signal to be modulated by two other signals. A first of these two other signals is used to modulate the carrier to encode data by introducing into the carrier Vokac's "audel levels" 110. In addition, the carrier may

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<Which is capable of being transmitted in a time compressed form> 151

<<said compressed representation of said audio/video source information>>

CLAIMS

1. An audio/video transceiver apparatus comprising:

input means for receiving audio/video source information;

compression means, coupled to said input means, for compressing said audio/video source information into a ~~time~~ compressed representation thereof <> having an associated <burst transmission time period that is shorter than a time period associated with ~~a~~ real time ~~representation~~ <viewing of said audio/video source information;

~~random access~~ storage means, coupled to said compression means, for storing the ~~time~~ compressed representation of said audio/video source information; and

output means, coupled to said ~~random access~~ storage means, for receiving the ~~time~~ compressed audio/video source information stored in said ~~random access~~ storage means <and for transmission <ting «» away from said audio/video transceiver apparatus <in said burst transmission time period.

2. An apparatus as claimed in claim 1 comprising editing means, coupled to said ~~random access~~ storage means, for editing the ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means and for restoring the edited ~~time~~ compressed representation of said audio/video source information in said ~~random access~~ storage means; and wherein said output means is operative for receiving the edited ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means for transmission away from said audio/video transceiver apparatus.

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3. An apparatus as claimed in claim 2 comprising monitor means for enabling the user to selectively identify the ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means during editing.

4. An apparatus as claimed in claim 2 comprising recording means, including a removable recording medium, coupled to said ~~random access~~ storage means, for storing the edited ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means onto said removable recording medium.

5. An apparatus as claimed in claim 4 comprising monitor means for enabling the user to selectively view the ~~time~~ compressed representation of said audio/video source information stored on said removable recording medium.

6. An apparatus as claimed in claim 2 comprising external video tape recorder means, coupled to said output means, for storing the edited ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means onto magnetic tape.

7. An apparatus as claimed in claim 1 wherein the output means comprises a fiber optic output port for coupling the apparatus to a fiber optic transmission line.

8. An apparatus as claimed in claim 1 wherein the output means comprises a modem for coupling the apparatus to a telephone transmission line.

9. An apparatus as claimed in claim 1 wherein:

said audio/video source information comprises analog audio/video source information;

said audio/video transceiver apparatus further comprises analog to digital converter

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means for converting said analog audio/video source information to corresponding digital audio/video source information;

said compression means is operative for compressing said corresponding digital audio/video source information into a digital ~~time~~ compressed representation thereof ~~having an associated time~~ period that is shorter than a time period associated with a ~~real time~~ representation of said ~~digital audio/video source information~~; and

said ~~random access~~ storage means is operative for storing said digital ~~time~~ compressed representation of said corresponding digital audio-video source information.

10. An apparatus as claimed in claim 9 wherein said input means is coupled to an external television camera and said analog audio-video source information comprises information received from said external television camera.

11. An apparatus as claimed in claim 9 wherein said input means is coupled to an external analog video tape recorder and said analog audio/video source information comprises information received from said external analog video tape recorder.

12. An apparatus as claimed in claim 9 wherein said input means is coupled to an external television RF tuner and said analog audio/video source information comprises information received from said external television RF tuner.

13. An apparatus as claimed in claim 9 wherein said input means comprises television RF tuner means coupled to an external television antenna and said analog audio/video source information comprises information transmitted by a remotely located television transmitter.

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14. An apparatus as claimed in claim 9 wherein said input means comprises television RF tuner means coupled to an external cable television system and said analog audio/video source information comprises information received from said external cable television system.

15. An apparatus as claimed in claim 9 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the digital ~~time~~ compressed representation of said corresponding digital audio/video source information stored in said ~~random access storage~~ means; and

editing means, coupled to said ~~random access~~ storage means and decompression means, for editing the decompressed digital ~~time~~ compressed representation of said corresponding digital audio/video source information and for then storing the edited decompressed digital ~~time~~ compressed representation of said corresponding digital audio/video source information in said ~~random access~~ storage means.

16. An apparatus as claimed in claim 15 comprising monitor means for enabling the user to selectively view the decompressed digital ~~time~~ compressed representation of said corresponding digital audio/video source information during editing.

17. An apparatus as claimed in claim 9 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the digital ~~time~~ compressed representation of said corresponding digital audio/video source information stored in said

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~~random access~~ storage means; and

monitor means, coupled to said decompression means, for enabling the user to selectively view the decompressed digital ~~time~~ compressed representation of said corresponding digital audio-video source information.

18. An apparatus as claimed in claim 9 comprising a video tape recorder for providing said analog audio/video source information.

19. An apparatus as claimed in claim 1 wherein:

said audio/video source information comprises digital audio/video source information;

said compression means is operative for compressing said digital audio/video source information into a digital ~~time~~ compressed representation thereof ~~having an associated time~~ period that is ~~shorter~~ than a time period associated with a real time representation of said ~~digital audio/video source information~~; and

said ~~tandem access~~ storage means is operative for storing said digital ~~time~~ compressed representation of said digital audio/video source information.

20. An apparatus as claimed in claim 19 wherein said input means is coupled to an external computer and said digital audio/video source information comprises computer-generated audio/video information.

21. An apparatus as claimed in claim 19 wherein said input means comprises a fiber optic input port coupled to a fiber optic transmission line and said digital audio/video source information comprises information received over said fiber optic transmission line.

22. An apparatus as claimed in claim 19 comprising:

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decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the digital ~~time~~ compressed representation of said digital audio/video source information stored in said storage ~~random access memory~~ means; and

editing means, coupled to said ~~random access~~ storage means and decompression means, for editing the decompressed digital ~~time~~ compressed representation of said digital audio/video source information;

said ~~random access~~ storage means thereafter being operative for storing the edited decompressed digital ~~time~~ compressed representation of said digital audio/video source information in said ~~random access~~ storage means.

23. An apparatus as claimed in claim 22 further comprising monitor means for enabling the user to selectively view the decompressed digital ~~time~~ compressed representation of said digital audio-video source information during editing.

24. An apparatus as claimed in claim 19 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the digital ~~time~~ compressed representation of said digital audio/video source information stored in said storage ~~random access memory~~ means; and

monitor means, coupled to said decompression means, for enabling the user to selectively view the decompressed digital ~~time~~ compressed representation of said digital audio-video source information.

25. An apparatus as claimed in claim 19

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comprising CD-ROM means for providing said digital audio/video source information.

26. An apparatus as claimed in claim 19 comprising erasable optical disc means for providing said digital audio/video source information.

27. An apparatus as claimed in claim 1 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing said ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means; and

editing means, coupled to said ~~random access~~ storage means and decompression means, for editing said selectively decompressed ~~time~~ compressed representation of said audio/video source information, and for storing said edited selectively decompressed ~~time~~ compressed representation of said audio/video source information in said ~~random access~~ storage means.

28. An apparatus as claimed in claim 27 comprising recording means, including a removable recording medium, coupled to said ~~random access~~ storage means, for storing the edited decompressed ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means.

29. An apparatus as claimed in claim 27 comprising external video tape recorder means, coupled to said output means, for storing the edited decompressed ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage mens onto magnetic tape.

30. An apparatus as claimed in claim 1 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively

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decompressing said ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means; and

editing means, coupled to said ~~random access~~ storage means and decompression means, for editing said selectively decompressed ~~time~~ compressed representation of said audio/video source information;

wherein said compression means is operative for recompressing the edited selectively decompressed ~~time~~ compressed representation of said audio/video source information; and

wherein said ~~random access~~ storage means is operative for storing the recompressed selectively decompressed ~~time~~ compressed representation of said audio/video source information.

31. An apparatus as claimed in claim 1 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means; and

monitor means for enabling the user to view the selectively decompressed ~~time~~ compressed representation of said audio/video source information.

32. An apparatus as claimed in claim 31 comprising:

recording means, including a removable recording medium, coupled to said decompression means, for storing the selectively decompressed ~~time~~ compressed representation of said audio/video source information on aid hard copy storage medium; and

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wherein said monitor means is operative for enabling the user to view the selectively decompressed ~~time~~ compressed representation of said audio/video source information stored on said removable recording medium.

33. An apparatus as claimed in claim 31 comprising external video tape recorder means, coupled to said output means, for storing the selectively decompressed ~~time~~ compressed representation of said audio/video source information onto magnetic tape.

34. An apparatus as claimed in claim 1 comprising recording means, including a removable recording medium, coupled to said ~~random access~~ storage means, for storing the ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means onto said removable recording medium.

35. An apparatus as claimed in claim 1 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means; and

recording means, including a removable recording medium, coupled to said decompression means, for storing the selectively decompressed ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means.

36. An apparatus as claimed in claim 1 comprising:

decompression means, coupled to said ~~random access~~ storage means, for selectively decompressing the ~~time~~ compressed representation

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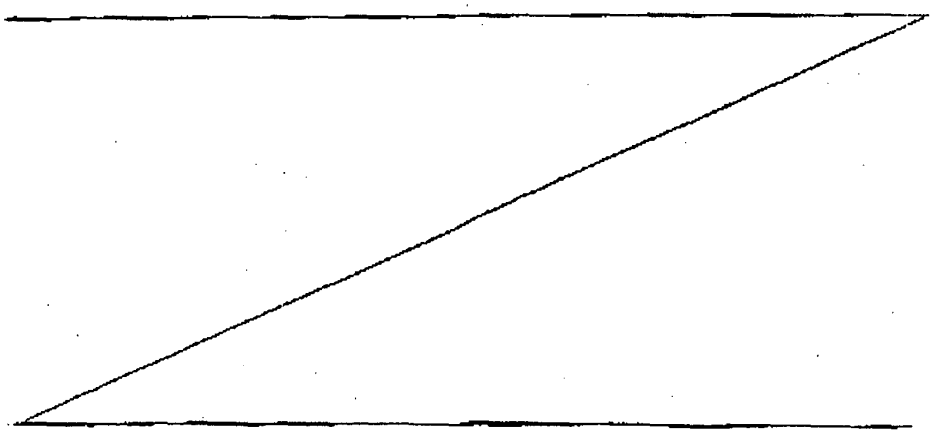
of said audio/video source information stored in said ~~random access~~ storage means; and

external video tape recorder means, coupled to said output means, for storing the selectively decompressed ~~time~~ compressed representation of said audio/video source information stored in said ~~random access~~ storage means.

37. An apparatus as claimed in claim 1 comprising editing means, coupled to said ~~random access~~ storage means, for editing said ~~time~~ compressed representation of said audio/video source information and for then storing the edited ~~time~~ compressed representation of said audio/video source information in said ~~random access~~ storage means.

38. An apparatus as claimed in claim 1 wherein said input means and output means comprises microwave transceiver means, coupled to a microwave link, for receiving said audio/video source information over said microwave link and for transmitting said ~~time~~ compressed audio/video source information stored in said ~~random access~~ storage means over said microwave link.

39. An apparatus as claimed in any preceding claim wherein the ~~random access~~ storage means comprises an optical disc, a semiconductor memory, a bubble memory, digital paper, or one or more magnetic discs.



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40. An audio/video information transfer network comprising a plurality of audio/video transceivers coupled via one or more communications links, each of the audio/video transceivers comprising:

input means for receiving audio/video source information;

compression means, coupled to said input means, for compressing said audio/video source information into a ~~time~~ compressed representation

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(which is capable of being transmitted in a time compressed form)

thereof having an associated burst transmission time period that is shorter than a time period associated with a real time ~~representation~~ viewing of said audio-video source information; and

~~random access~~ storage means, coupled to said compression means, for storing the ~~time~~ compressed representation of said audio/video source information; and

output means, coupled to said storage means and to one of said one or more communications links, for receiving the ~~time~~ compressed ~~format~~ representation of said audio/video source information stored in said ~~random access~~ storage means for transmission in said burst transmission time period to another one of said plurality of audio/video transceivers.

41. A network as claimed in claim 40 wherein said input means of one of said plurality of audio/video transceivers comprises a fiber optic input port, said output means of another one of said plurality of audio/video transceiver apparatus comprises a fiber optic output port, and one of said one or more communication links comprises a fiber optic transmission line coupled between said fiber optic input port and said fiber optic output port.

42. A network as claimed in claim 40 wherein said output means of one of said plurality of audio/video transceiver apparatus comprises a modem and one of said one or more communications links comprises a telephone transmission line.

43. A network as claimed in claim 40 wherein at least one of said audio/video transceivers comprises recording means, including a removable recording medium, coupled to said ~~random access~~ storage means, for storing the ~~time~~ compressed representation of said

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audio/video source information stored in said ~~random accessd~~ storage means onto said removable recording medium.

44. A network as claimed in claim 40 wherein at least one of said audio/video transceivers comprises:

decompression means, coupled to said ~~random accessd~~ storage means, for decompressing the ~~time~~ compressed representation of said audio/video source information stored in said ~~random accessd~~ storage means; and

recording means, including a removable recording medium, coupled to said decompression means, for storing the decompressed ~~time~~ compressed ~~format~~ representation of said audio/video source information onto said removable recording medium.

45. A network as claimed in claim 43 or 44 wherein said recording means comprises a video tape recorder and said removable recording medium comprises magnetic tape.

46. A network as claimed in claim 43 or 44 wherein said recording means comprises a write once read many (WORM) optical disc drive and said removable recording medium comprises one or more WORM discs.

47. A network as claimed in claim 43 or44 wherein said recording means comprises an erasable optical disc drive and said hard copy storage medium comprises one or more erasable optical discs.

48. A network as claimed in any one of claims 40 - 47 wherein the ~~random accecq~~ storage means comprises an optical disc memory or a semiconductor memory.

49. A network as claimed in any one of claims 40 - 47 wherein said ~~random accesq~~ storage means of one of said plurality of audio/video transceiver apparatus stores a library comprising a multiplicity of items of

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audio/video source information in said ~~time~~ compressed representation for selective transmission in said associated burst transmission time period to another one of said audio/video transceivers.

50. An audio/video transceiver apparatus as claimed in claim 1, in which ~~comprising~~:

said input means is arranged for receiving analog and/or digital audio/video source information; and comprising

analog to digital converter means for converting analog audio/video source information received at said input means to corresponding digital audio/video source information;

digital to analog converter means for converting digital audio/video source information received at said input means to corresponding analog audio/video source information; and wherein said compression means comprises

compressor/decompressor means for compressing digital audio/video source information received at said input means or said corresponding digital audio/video source information received from said analog to digital converter means into a ~~time~~ compressed representation of said digital or corresponding digital audio/video source information, ~~said time compressed representation having an associated time period that is shorter than a time period associated with a real time representation of said digital or corresponding digital audio/video source information~~ said compressor/decompressor means being further operative for decompressing said ~~time~~ compressed representation into a decompressed real time representation of said digital or corresponding digital audio/video source information; and comprising

central processing unit means for controlling operation of said compressor/decompressor means;

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~~random access~~ storage means for storing said ~~time~~ compressed representation of said digital or corresponding digital audio/video source information ~~and~~ for storing said decompressed real time representation of said digital or corresponding digital audio/video source information;

controller means for enabling communication between said compressor/decompressor means, said central processing unit means, and said ~~random access memory~~ storage means; and

said output means for receiving said time compressed representation of said digital or corresponding digital audio/video source information stored in said random access storage means for transmission away from said audio/video transceiver apparatus.

51. An apparatus as claimed in claim 50 comprising time base generator mean for supplying timing information for association with the ~~time~~ compressed representation of the digital or corresponding digital audio/video source information.

52. An apparatus as claimed in claim 50 comprising audio/video recording means including a recording medium for recording said analog or corresponding analog audio/video source information onto the recording medium.

53. An apparatus as claimed in claim 50 further comprising audio/video recording means, including a recording medium, for recording said digital or corresponding digital audio/video source information onto said recording medium.

54. An apparatus as claimed in claim 52 or 53 wherein the recording medium comprises magnetic tape.

55. An apparatus as claimed in claim 53 wherein

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the recording medium comprises a CD-ROM or a WORM or an erasable optical disc.

56. An apparatus as claimed in any one of claims 50 -55 comprising audio/video recording and playback means coupled to the input means for providing said analog and/or digital audio/video source information.

57. An apparatus as claimed in any of claims 50 - 55 comprising high speed bus means coupled to the input means, and wherein the input means comprises auxiliary digital input means for receiving the digital audio/video source information.

58. An apparatus as claimed in claim 57 wherein the high speed bus means comprises an optical bus.

59. An apparatus as claimed in any one of claims 50 -55 comprising high speed bus means coupled to said input means, and wherein said input means comprises fiber optic means for receiving said digital audio/video source information.

60. An apparatus as claimed in any one of claims 50 -56 comprising high speed bus means, and wherein said analog to digital converter means, digital to analog converter means, compressor/decompressor means, central processing unit means, and controller means are coupled to said ~~random access~~ storage mean via said high speed bus means.

61. An apparatus as claimed in claim 60 comprising RGB converter means for converting information stored in said ~~random access~~ storage means to an RGB format, and wherein said output means comprises RGB output means for receiving RGB format information from said RGB converter means.

62. An apparatus as claimed in claim 60 wherein said output means comprise audio/video transmitter/receiver means coupled to said high speed bus for receiving said ~~prime~~ compressed representation

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of said digital or corresponding digital audio/video source information stored in said audio/video transceiver apparatus.

63. An apparatus as claimed in claim 62 wherein the audio/video transmitter/receiver mean comprises a modem for coupling to a telephone transmission line, or a fiber optic transceiver for coupling to a fiber optic transmission line.

64. An apparatus as claimed in claim 50 comprising:

digital control unit means, said digital control unit means comprising:

additional central processing unit means;

read-only memory means coupled to said additional central processing unit means for storing microinstructions defining a plurality of selected editing functions; and

additional controller means for enabling communication between said additional central processing unit means and said read-only memory means; and

said additional central processing unit means being operative for selectively executing the microinstructions stored in said read-only memory means to perform one or more of said plurality of selected editing functions.

65. An apparatus as claimed in claim 64 wherein said digital control unit means is coupled to said ~~random-access~~ storage means.

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<which is capable of being transmitted in a time compressed form>

66. A method for handling audio/video source information, the method comprising:

receiving audio/video source information;

compressing the received audio/video source information into a ~~time~~ compressed representation thereof <> having an associated burst transmission time period that is shorter than a time period associated with a real time ~~representation~~ viewing of the received audio/video source information;

storing said ~~time~~ compressed representation of the received audio/video source information; and

transmitting, in said burst transmission time period, the stored ~~time~~ compressed representation of the received audio/video source information to a selected destination.

67. A method as in claim 66 further comprising the steps of:

editing the stored ~~time~~ compressed representation of said audio/video source information; and

storing the edited ~~time~~ compressed representation of said audio/video source information.

68. A method as in claim 67 further comprising the step of monitoring the stored ~~time~~ compressed representation of said audio/video source information during editing.

69. A method as in claim 66 wherein the step of transmitting comprises transmitting said ~~time~~ compressed representation of said audio-video source information over an optical channel.

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70. A method as in claim 66 wherein the step of transmitting comprises transmitting said ~~time~~ compressed representation of said audio/video source information over a telephone transmission channel.

71. A method as in claim 66 wherein the step of storing comprises storing the ~~time~~ compressed representation of said audio/video source information on an optical disk.

72. A method as in claim 66 wherein the step of storing comprises storing the ~~time~~ compressed representation of said audio/video source information in a semiconductor memory.

73. A method as in claim 66, wherein the audio/video source information comprises a multiplicity of video frames in the form of one or more full motion video programs.

74. A method as in claim 73, wherein the step of transmitting comprises transmitting said ~~time~~ compressed representation of said audio/video source information over a microwave channel.

75. A method as in claim 73, wherein the step of storing comprises storing the ~~time~~ compressed representation of said received audio/video source information in a bubble memory.

76. A method as in claim 73, wherein the step of storing comprises storing the ~~time~~ compressed representation of said received audio/video source information in a digital paper memory.

77. A method as in claim 73, wherein the step of storing comprises storing the ~~time~~ compressed representation of said received audio/video source information on one or more magnetic disks.

78. A method as in claim 66 wherein:

said audio/video source information comprises analog

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audio/video source information;

said method further comprises the step of converting said analog audio/video source information to corresponding digital audio/video source information;

said step of compressing comprises compressing said corresponding digital audio/video source information into a digital ~~time~~ compressed representation thereof ~~having an associated burst time period that is shorter than a time period associated with a real time representation of said digital audio/video source information~~; and

said step of storing comprises storing said digital ~~time~~ compressed representation of said corresponding digital audio/video source information.

79. A method as in claim 66 wherein:

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said audio/video source information comprises digital audio/video source information;

said step of compressing comprises compressing said digital audio/video source information into a digital ~~time~~ compressed representation thereof ~~having an associated burst~~ time period that is shorter than a time period associated with a real ~~time~~ representation of said digital audio/video ~~source information~~; and

said step of storing comprises storing said digital ~~time~~ compressed representation of said digital audio/video source information.

80. A method as in claim 78 wherein said audio/video source information comprises information received from a television camera.

81. A method as in claim 78 wherein said audio/video source information comprises information received from an analog video tape recorder.

82. A method as in claim 78 wherein said audio/video source information comprises information received from a television RF tuner.

83. A method as in claim 78 wherein said audio/video source information comprises information transmitted by a remotely located television transmitter.

84. A method as in claim 78 wherein said audio/video source information comprises information received from a cable television system.

85. A method as in claim 79 wherein said audio/video

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source information comprises information received from a computer.

86. A method as in claim 79 wherein said audio/video source information comprises information received over a fiber optic transmission line.

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87. A method as in claim 66 comprising:

providing a network that includes a plurality of audio/video transceivers, coupled via one or more communication links;

said selected destination comprising one or more of said plurality of audio/video transceivers.

88. A method as in claim 87 wherein said audio/video source information is received over one or more optical transmission channels and the stored ~~time~~ compressed representation of the received audio/video source information is transmitted over one or more optical transmission channels.

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89. A method as in claim 87 wherein the stored ~~time~~ compressed representation of the received audio/video source information is transmitted over one or more telephone transmission channels.

90. A method as in claim 87 wherein the ~~time~~ compressed representation of the received audio/video source information is stored in an optical disk memory.

91. A method as in claim 87 wherein the ~~time~~ compressed representation of the received audio/video source information is stored in a semiconductor memory.

92. A method as in claim 87 wherein one of said plurality of audio/video transceivers stores a library containing a multiplicity of programs of audio/video source information as ~~time~~ compressed representations thereof for selective transmission, in an associated burst transmission time period, to one or more of the remaining plurality of audio/video transceivers.

93. A method as in claim 87 further comprising the step of recording the stored ~~time~~ compressed representation of said audio/video source information onto a removable recording medium.

94. A method as in claim 87 further comprising the steps of:

decompressing the stored ~~time~~ compressed representation of said audio/video source information; and

recording the decompressed ~~time~~ compressed representation of said audio/video source information onto a

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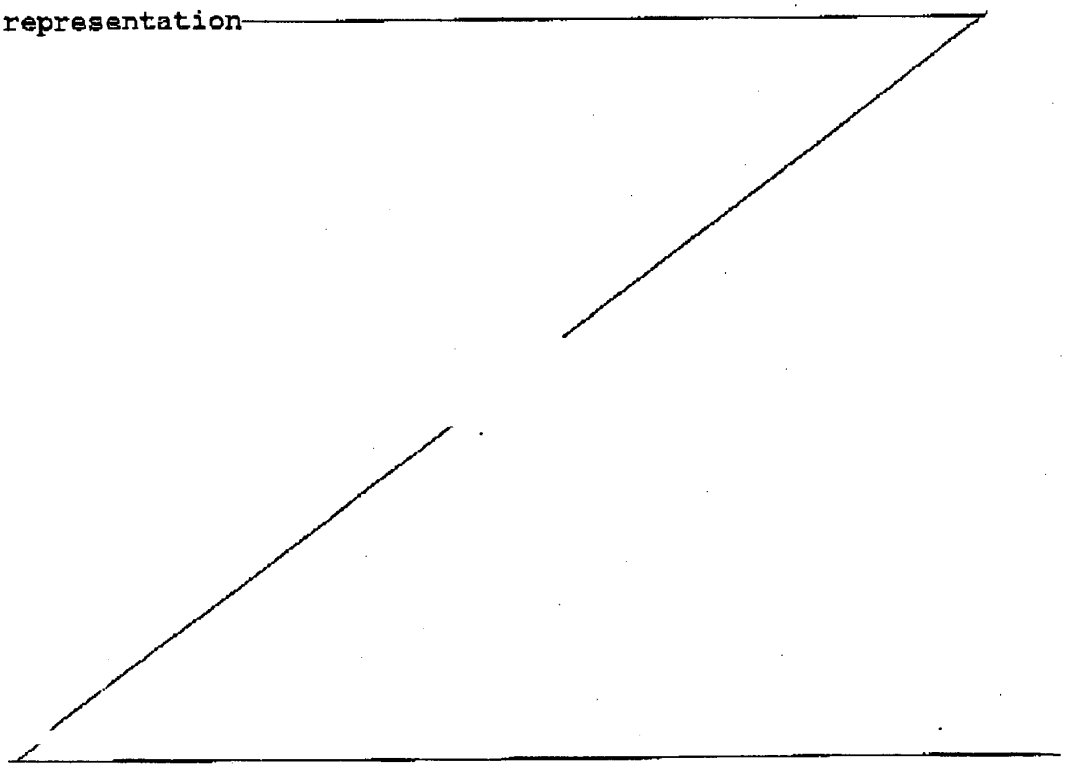
removable storage medium.

95. A method as in claim 93 or 94 wherein the stored ~~time~~ compressed representation of said audio/video source information is recorded onto a magnetic tape within a video tape recorder.

96. A method as in claim 93 or 94 wherein the stored ~~time~~ compressed representation of said audio/video source information is recorded onto one or more write-once read-many (WORM) optical disks within an optical disk drive.

97. A method as in claim 93 or 94 wherein the stored ~~time~~ compressed representation of said audio/video source information is recorded onto one or more erasable optical disks within an optical disk drive.

98. A method as in claim 66 further comprising the step of recording the stored ~~time~~ compressed representation



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of said audio/video source information onto a removable recording medium.

99. A method as in claim 66 further comprising the steps of:

selectively decompressing the stored ~~time~~ compressed representation of said audio/video source information; and

recording the selectively decompressed ~~time~~ compressed representation of said audio/video source information onto a removable recording medium.

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100. A method as in claim 79 wherein said digital audio/video source information is received from a CD-ROM.

101. A method as in claim 79 wherein said digital audio/video source information is received from an erasable optical disk.

102. A method as in claim 66 further comprising the step of recording the stored ~~time~~ compressed representation of said audio/video source information onto a magnetic recording medium.

103. A method as in claim 67 further comprising the step of recording the stored edited ~~time~~ compressed representation of said audio/video source information onto a magnetic recording medium.

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104. A method as in claim 66 further comprising the steps of:

selectively decompressing the stored ~~time~~ compressed representation of said audio/video source information; and

recording the selectively decompressed stored ~~time~~ compressed representation of said audio/video source information onto a magnetic storage medium.

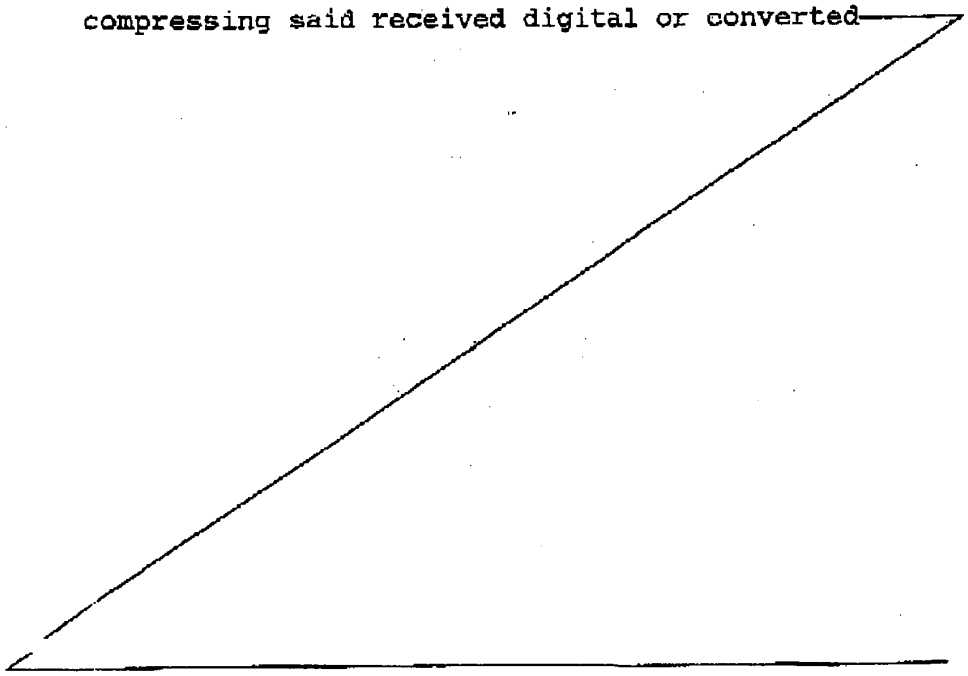
105. A method as claimed in claim 66 for handling analog and/or digital audio/video source information, the method comprising the steps of:

receiving analog and/or digital audio/video source information;

converting received analog audio/video source information to corresponding digital audio/video source information;

converting received digital audio/video source information to corresponding analog audio/video source information;

compressing said received digital or converted



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corresponding digital audio/video source information into a ~~time~~ said compressed representation thereof ~~having an associated~~ burst time period that is shorter than a time period associated with a real time representation of said received digital or converted corresponding digital audio/video ~~source information~~;

storing said ~~time~~ compressed representation;

decompressing said ~~time~~ compressed representation into a real time representation of said received digital or converted corresponding digital audio/video source information;

storing said real time representation; and

transmitting said time compressed representation to a selected destination.

106. A method as in claim 105 further comprising the step of supplying timing information for association with said said ~~time~~ compressed representation.

107. A method as in claim 105 further comprising the step of recording said received analog or corresponding analog audio/video source information onto a recording medium.

108. A method as in claim 105 further comprising the step of recording said received digital or corresponding digital audio/video source information onto a recording medium.

109. A method as in claim 105 wherein said received analog or corresponding analog audio/video source

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information is recorded onto a magnetic tape recording medium.

110. A method as in claim 108 wherein said received digital or corresponding digital audio/video source information is recorded onto a magnetic tape recording medium.

111. A method as in claim 108 wherein said received digital or corresponding digital audio/video source information is recorded onto a CD-ROM.

112. A method as in claim 108 wherein said received digital or corresponding digital audio/video source information is recorded onto a WORM optical disk.

113. A method as in claim 108 wherein said received digital or corresponding digital audio/video source information is recorded onto an erasable optical disk.

114. A method as in claim 108 wherein said received analog and/or digital audio/video source information is received from an audio/video recording and playback apparatus.

115. A method as in claim 105 wherein said digital audio/video source information is received over a high speed bus.

116. A method as in claim 105 wherein said digital audio/video source information is received over an optical bus.

117. A method as in claim 105 further comprising the step of selectively editing the received analog and/or digital audio/video source information.

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118. A method for handling audio/video source information, the method comprising:

receiving audio/video source information as a ~~time~~ compressed ~~digital~~ representation thereof, said audio/video source information comprising a multiplicity of ~~video~~ frames in the form of one or more full motion video programs selected from a video library storing a multiplicity of full motion video programs in a ~~time~~ compressed digital representation thereof for selective retrieval, said ~~time~~ compressed digital representation of the received audio/video source information being received in an associated burst transmission time period that is shorter than a time period associated with a real time ~~representation~~ viewing of said received audio/video source information;

storing the ~~time~~ compressed digital representation of said received audio/video source information; and

transmitting, in said burst transmission time period, the stored ~~time~~ compressed digital representation of said received audio/video source information to a selected destination.