Description

Field of the invention

This invention relates generally to systems for recovering information from video recording discs, and more particularly to a system that moves an information recovery device rapidly, relative to a plurality of information tracks on a videodisc, toward a selected target track on the disc to recover information recorded on the target track. When desired, special functions are subsequently performed which enhance the operational character of the system.

Description of the prior art

Prior art apparatus directs a reading beam of light at a selected one of a plurality of spiralling and substantially circular information tracks or concentric circular information tracks on a rotatable recording disc. The intensity of the beam is modulated by the recorded information which includes a unique address signal for each track, and the apparatus detects the modulated beam to produce a playback signal indicative of the recorded information.

The known apparatus includes means for selecting a particular target track to be scanned, together with a carriage motor and a movable mirror for moving the reading beam radially toward the target track with course and fine movements, respectively. The apparatus further includes means for monitoring the playback signal to detect periodically the track identifying code, or address, of the track currently being scanned.

Such current address is compared to the target track identifying code, or address, and the apparatus applies prescribed sequential drive signals to the carriage motor, depending on the remaining distance to the target track. The speed of the carriage motor is stepped succesively downwardly as the reading beam reaches predetermined distance thresholds during carriage translation. During the last stage of carriage translation, the movable mirror increments the beam radially by one track spacing during each revolution of the disc, thereby "playing" into the target track.

EP—A—4476 describes radial tracking means for an optical apparatus with a video disc. The radial tracking means maintain the focused light spot to impinge upon the centre of an information track. For starting a stop-mode of operation a white flag is detected. From FR—A—2 376 486 the need is known to identify the image, because an image comprises at least 2 fields so that it could occur that fields belonging to different images are read.

Although the information recovery system described above has proven effective in rapidly moving a reading beam toward a selected target track to recover information recorded thereon, the system does not operate satisfactorily.

Another problem is the inability to transfer information from the disc to an external station in synchronisation with a command to transmit issued from the external station. In other words, while a disc player provides a full internal synchronization of its own recovered signal to a monitor, it is often that external equipment receiving information does not receive such information in full synchronization with its "fetch" commands. Accordingly, there is a need to provide a playback system which can receive a "fetch" command from an external station, wait an appropriate length of time regardless of the relative time between receipt of the "fetch" command and the timing of the information being played by the disc player, and output the required information in full synchronization and compatibility with the external station.

Brief description of the invention

It is an object of the invention to provide a method and means for transferring information from a videodisc to an external station in synchronization. Basically, this feature of the invention permits the successful identification of a particular field of a particular frame searched for on the disc. One of the problems associated with the prior art technology in the videodisc field concerns the need for precisely identifying the first or second (and sometimes third) field of a frame in order that synchronization with external equipment can be effected.

For example, if program material is to be taken from the disc downstream of the lead-in portion, it is necessary to identify when that program material is to be taken off a disc, and to appropriately set up a transmit enable signal so that the occurrence of the next vertical sync pulse will signify the beginning of the program material to be loaded into the external equipment from the disc. This particular feature of the invention is termed "white flag wait", an explanation of the term being presented later in this description.

Another example of the use of the white flag wait feature is that of stop-motion audio where digitized audio is to be taken from a disc and played out in real time while the disc is still framing, and in such a case, it is necessary to transmit the digitized audio information at precisely the appropriate time that it occurs on the videodisc relative to the played-back program. Thus, if the digitized audio is to begin on the first field of a selected frame, it is necessary to generate a transmit signal on the second (or last) field of the previous frame so that the information contained in the next field (and perhaps subsequent fields) is available for being taken off the disc at the exact time that the external equipment is ready to receive it. Without proper field identification, a transmit command could be premature by one field or possibly delayed by one field so that the information transferred to the external equipment is picked up too early or in the middle of the information to be transmitted. The white flag wait feature of the invention is effective to reliably identify the second (or last) field of the frame preceding the frame from which the

desired information is to be taken. Of course, in the event that the information to be taken from a disc begins on a second field of a frame, a slight modification of the apparatus can be made to accommodate this altered form of the invention.

With the object in view the invention provides a method of transmitting intelligence information from a playback device to an external receiving device, said intelligence information being recorded in at least one video field of a video information signal recorded on a record medium, the video information signal being recovered by said video playback device, the video information further containing in part a sequence of vertical synchronization pulses occurring at a field rate, wherein a white flag identifies the end of the second field of a two-field per frame set, said method characterized by the steps of: searching for, locating, and playing a designated frame next preceding in time the video field containing at least the beginning of said intelligence information; detecting the next white flag signal occurring in time, said next white flag signal being the one associated with said designated frame; jumping back two fields responsive to detecting said next white flag signal; playing said two fields in a forward play mode; utilizing the next vertical synchronization pulse in time, after said jumping back two fields, and during playing of said two fields, to generate a transmit enable pulse; utilizing the transmit enable pulse to generate a data flow enable gate signal at the coincidence of said transmit enable pulse and the next white flag signal occurring in time; and, gating said intelligence information to an external receiving device in response to said data flow enable gate signal.

The invention further provides an apparatus for transmitting intelligence information from a playback device to an external recording device, said intelligence information (615) being recorded in at least one video field of a video information signal recorded on a record medium (13), the video information being recovered by said video playback device, the video information further containing in part a sequence of vertical synchronization pulses (611) occurring at a field rate, wherein a complete picture frame is defined by two adjacent fields, and wherein an end-of-frame signal (619) identifies the end of the second field of each two field per frame set, said apparatus characterized by player means for searching for, locating, and playing a designated frame next preceding in time the video field containing at least the beginning of said intelligence information; means for detecting the next end-of-frame signal in time, said next end-of-frame signal being the one associated with said designated frame; means for jumping back two fields responsive to detecting said next end-of-frame signal; means for playing said two fields in a forward play mode; means (623) responsive to detection of the next vertical synchronization pulse in time, after said jumping back two fields and during playing of said two fields, for generating a transmit enable pulse; means (625) responsive to the transmit enable pulse for generating a data flow enable gate signal at the coincidence of said transmit enable pulse and the next end-of-frame signal occurring in time; and, gate means (625) responsive to said data flow enable gate signal for gating said intelligence information to the external receiving device.

Brief description of the drawings

Figure 1 is a general block diagram of the components of a videodisc player which function to carry out the objects of the invention;

Figure 2 is a more detailed block diagram of the portion of Figure 1 concerning the tracking and track jumping characteristics of the invention;

Figure 3 is an illustration of the relationship between an open loop tracking error signal and the radial cross-section of tracks on a videodisc;

Figure 4 is a block diagram showing the details of the components of a videodisc player involved in performing a stop-motion effect;

Figure 5 is a timing chart showing the relationships between the various waveforms necessary to perform a white flag wait function according to the invention; and

Figure 6 is a block diagram showing the interconnections for accomplishing the white flag wait feature of the invention.

Detailed description of the preferred embodiments

Referring now to the drawings, and particularly Figure 1, there is shown apparatus for moving a reading beam of light 11 in a radial direction relative to a rotating recording disc 13, to recover information from a selected target track on the disc. The disc includes a plurality of closely spaced, circular and concentric recording tracks, and each track records a video signal representing one or more video frames, with a unique frame or track address signal located in each vertical interval (i.e., two address signals per frame).

The apparatus includes a spindle motor 15 for rotating the recording disc 13 at a prescribed constant angular velocity, and an optical system 17 and an objective lens 19 for focusing the reading beam 11 onto a selected track of the rotating disc. The reading beam is reflected by the disc to produce a reflected beam 21 having an intensity that is modulated in accordance with the recorded information. The objective lens and optical system direct this reflected beam to a detector 23 which detects and demodulates the modulated intensity of the beam to produce a baseband video signal corresponding to the recorded information. This video signal is coupled over line 25 to both a monitor 27 and an address recovery and estimator circuit 29. The monitor provides a real-time display of the video signal recovered from the target track, and the address recovery circuit detects the address signals in the successive vertical intervals of the video signal, using conventional techniques. The

address recovery circuit then updates an address register 30 with each detected track address signal.

The apparatus further includes a coarse positioning system and a fine positioning system for controllably moving the reading beam 11 radially relative to the disc 13, toward the selected target track on the disc. The coarse positioning system includes a carriage motor 31 and appropriate gearing 33 for moving the beam at a selected one of two relatively high radial velocities (e.g., 100 and 500 tracks per disc revolution). The fine positioning system includes a movable mirror (not shown) located in the optical system 17 for controllably adjusting the beam's point of impingement on the disc over a relatively small range (e.g., about 50 tracks in either direction).

When a user desires to recover information recorded on a selected target track on the disc 13, he or she inputs a special target address code signal on line 35, indicating the target track's address. A function generator 37 compares this target address signal with the address signal currently being stored by the address register 30. In accordance with a prescribed algorithm, the function generator determines the radial separation between the current track and the target track, and outputs appropriate control signals to controllably drive the carriage motor 31 and the movable mirror of the optical system 17 so as to move the reading beam 11 toward the target track. These control signals are sequenced such that the beam reaches the target track in a time substantially less than that achieved by prior apparatus of this kind.

The carriage motor 31 is driven at a prescribed velocity (or sequence of velocities) until the reading beam 11 has been moved to within a prescribed number of tracks of the target track, after which the movable mirror of the optical system 17 is conditioned to incrementally jump the beam from one track to the next a plurality of times during each half revolution of the disc 13.

More particularly, the coarse positioning system further includes a track scan driver 39 and a carriage motor tachometer 41 for controllably driving the carriage motor 31 in the prescribed fashion. The function generator 37 outputs a plurality of velocity commands for coupling over lines 43a—d to the track scan driver, which, in turn, controllably adjust a dc drive signal coupled over line 45 to the carriage motor. The tachometer feeds back to the track scan driver over line 47 a carriage tachometer signal indicating the carriage motor's angular velocity, to enhance control of that velocity. Also, a dc tracking error signal is coupled to the track scan driver over line 49 to controllably move the carriage motor so as to reduce any steady state deflection of the movable mirror of the optical system 17.

Referring again to Figure 1, the fine positioning system further includes a tracking servo in the form of a tracking controller 67 for producing a radial correction signal for coupling over line 69 to the movable mirror of the optical system 17. Depending on the operating mode of the apparatus, this signal either maintains the reading beam 11 aligned with a selected target track, or incrementally jumps the beam from track to track while approaching the target track. The tracking controller receives a plurality of track jump commands supplied on lines 71, 73 and 75 from the function generator 37, along with a tracking error signal supplied on line 77 from the detector 23.

When the apparatus is operating in a mode in which the reading beam 11 is to be maintained in alignment with a selected track, the tracking controller 67 merely amplifies the tracking error signal and couples it directly to the movable mirror of the optical system 17, to form a conventional closed loop tracking servo for controllably aligning the beam with the track. On the other hand, when the apparatus is in a search mode in which the beam is to be moved incrementally from track to track, the tracking error signal is uncoupled from the movable mirror, and a prescribed sequence of pulses is coupled in its place.

The tracking controller 67 is depicted in greater detail in Figure 2. It includes a disable switch circuit 79, an amplifier 81, and a power driver 83, for amplifying the tracking error signal supplied on line 77 and outputting it as the radial correction signal for coupling over line 69 to controllably position the movable mirror of the optical system 17 (Figure 1). The tracking error signal is coupled through the disable circuit 79 at all times except during the search mode of operation or when jumping multiple tracks in a jump mode to be discussed later. The output of the disable circuit is coupled over line 85 to the negative input terminal of the amplifier 81, and the output of the amplifier is, in turn, coupled over line 87 to the power driver 83, which outputs the radial correction signal. The signal output on line 85 by the disable circuit is also coupled to a low-pass filter 89 to produce the dc tracking error signal for coupling on line 49 to the track scan driver 39 (Figure 1).

At the beginning stage of each search mode of operation in which the carriage motor 31 moves the reading beam 11 rapidly toward a target track, the tracking error signal experiences wide variations in level as the beam crosses the successive tracks. With reference to Figure 3, which is a fragmentary cross-sectional view of the disc 13 showing three recording tracks along a disc radius, it will be observed that the open-loop tracking error signal is a large amplitude ac signal having a level of zero at the center line 91 of each track. The disable circuit 79 uncouples the tracking error signal from the amplifier 81 at this time, to ensure that the apparatus does not attempt to controllably align the reading beam 11 with any track as it moves radially toward the target track.

In the search mode of operation, the coarse positioning system, which includes the carriage motor 31, operates whenever the distance between the target track and the present track exceeds a prescribed threshold, and the fine

positioning system, which includes the movable mirror of the optical system 17, operates whenever this distance does not exceed the threshold. When the coarse positioning system is operating, a tracking disable command is coupled over line 71 from the function generator 37 to the tracking controller 67. This signal is coupled through an OR gate 93, and in turn over line 95 to the disable circuit 79, to uncouple the tracking error signal from the amplifier 81. The radial correction signal output by the tracking controller 67 on line 69 therefore has a level of zero, and the movable mirror remains stationary.

After the reading beam has been moved to a position within a prescribed number of tracks of the target track, the function generator 37 (Figure 1) no longer outputs velocity commands to the track scan driver 39, and the carriage motor 31 is no longer driven at a relatively high speed. A prescribed time delay thereafter, the function generator terminates the tracking disable command previously coupled over line 71 to the tracking controller 67, so that the tracking error signal is again coupled through the tracking controller to form the tracking servo loop for controllably aligning the reading beam 11 with whatever recording track the beam arrives at. Thereafter, the tracking controller outputs a prescribed sequence of pulses to jump the reading beam incrementally from track to track until it reaches the target track.

To effect the incremental jumping, the tracking controller 67 includes a kick generator 97, a zero crossing detector 99, a jumps-down counter 101, and a flip-flop 103. When the incremental jumping is to be initiated, a binary code indicating the number of tracks (e.g., 11 tracks) to be jumped during the next half revolution of the disc 13 is supplied on lines 73 from the function generator 37 and entered into the jumps-down counter. Simultaneously, a jump command signal supplied on line 75 from the function generator is coupled to the set direct input terminal of the flip-flop. This sets the Q output signal into the logical "1" state, and this signal is coupled over line 105 to the OR gate 93, and in turn over line 95 to the disable circuit 79, to open the tracking servo loop.

The $\overline{Q}$ output signal of the flip-flop 103 is coupled over line 107 to the kick generator 97, which responds by outputting a single pulse signal for coupling over line 109 to the positive input terminal of the amplifier 81. This pulse signal is coupled through the amplifier and power driver 83 to the movable mirror of the optical system 17, to accelerate the reading beam 11 in the direction of the target track.

After the reading beam has been accelerated in the direction of the target track by the kick generator 97, the zero crossing detector 99 monitors the open loop tracking error signal supplied on line 77 and outputs a clock pulse each time it detects a track crossing by the beam. These successive clock pulses are coupled over line 111 to the clock terminal of the jumps-down counter 101, to decrement the stored count, accordingly. When the count reaches zero, the counter outputs a reset pulse for coupling over line 113 to the reset direct terminal of the flip-flop 103.

The reset pulse coupled over line 113 to the reset direct terminal of the flip-flop 103 returns the $\overline{Q}$ output signal to the logical "1" state, which triggers the kick generator 97 to output a pulse of opposite polarity to that of the original pulse, thereby decelerating the movable mirror. The reset pulse simultaneously returns the Q output signal of the flip-flop to the logical "0" state, so that the tracking servo loop is no longer disabled by the disable circuit 79 and the loop can again function to controllably align the reading beam 11 with the track then being scanned. During this time, the dc tracking error signal is coupled on line 49 to the track scan driver 39, to controllably move the carriage motor 31 so as to reduce the deflection of the movable mirror.

For a low number of tracks to jump, e.g., ten or less, the reading beam 11 preferably traverses the prescribed number of tracks during the vertical interval. Since the monitor screen is then blanked, a noiseless jump will have been effectuated.

The kick generator 97 can include two monostable multivibrator or one-shot circuits, one triggered by a positive-going transition and the other by a negative-going transition. The kick generator can further include appropriate gating circuits to ensure that the successive pulses it produces have the correct polarity to move the reading beam 11 in the direction of the target track. These gating circuits are responsive to the forward and reverse direction commands supplied on lines 43c and 43d, respectively.

In an alternative embodiment, the tracking controller 67 radially accelerates and decelerates the reading beam 11 such that it moves by just one track spacing each time.

After the reading beam 11 finally reaches the target track, the apparatus can operate, for example, in a stop-motion mode, to scan the track repeatedly and display the recovered video signal. If the successive tracks are arranged in a spiral pattern, the apparatus must jump the beam backward by one track spacing during each disc revolution, preferably during a vertical interval.

Referring to Figure 4, there is shown a block diagram of the stop motion subsystem employed in the videodisc player. The video signal from the FM detector and demodulator 23 is applied to an input buffer stage 271. The output signal from the buffer 271 is applied to a DC restorer 273. The function of the DC restorer 273 is to set the blanking voltage at a constant uniform level. Variations in signal recording and recovery result in video signals with different blanking levels. The output from the DC restorer 273 is applied to a white flag detector circuit 257. The function of the white flag detector 257 is to identify the presence of an all white level video signal existing during an entire line of one or both fields contained in the vertical interval of a frame of video information, although the white flag may take other forms.

One such form would be a special number stored in a line. Alternatively, the white flag detector can respond to the address indicia found in each video frame for the same purpose. Other indicia can also be employed. However, the use of an all white level signal during an entire line interval in the picture frame of information has been found to be the most useful and reliable.

The vertical sync signal recovered from the video is applied to a delay circuit 253. The output from the delay circuit 253 is supplied to a vertical window generator 255. The function of the window generator 255 is to generate an enabling signal for application to the white flag detector 257 to coincide with that line interval in which the white flag signal has been stored. The output signal from the generator 255 gates the predetermined portion of the video signal from the FM detector and generates an output white flag pulse whenever the white flag is contained in the portion of the video signal under surveillance. The output from the white flag detector 257 is applied to a stop motion pulse generator 265 through gate 259 and stop motion mode selector 261. The gate 259 has as a second input signal, the stop motion mode enabling signal from the function generator 37 (Figure 1).

The differential tracking error from the detector and demodulator 23 is applied over line 77 (Figure 1) to a zero crossing detector and delay circuit 269. The function of the zero crossing detector circuit 269 is to identify when the lens crosses the mid points 91 between two adjacent tracks as shown with reference to line (a) of Figure 3. This mid point is the point at which the differential tracking error shown in line (b) of Figure 3 corresponds to the mid point 91 between adjacent tracks.

The output of the zero crossing detector and delay circuit 269 is applied to the stop motion pulse generator 265. The stop motion pulse generated in the generator 265 is applied to a plurality of locations, the first of which is as a loop interrupt pulse to the tracking controller servo. A second output signal from the stop motion pulse generator 265 is applied to a stop motion compensation sequence generator 267. The function of the stop motion compensation sequence generator 267 is to generate a compensation pulse waveform for application to the radial tracking mirror in optical system 17 to cooperate with the actual stop motion pulse sent directly to the tracking mirror servo. The stop motion compensation pulse is thus also sent to the tracking servo.

Briefly, the stop motion pulse to the tracking servo causes the radial tracking mirror to leave the track on which it is tracking and jump to the next sequential track. A short time later, the radial tracking mirror receives a stop motion compensation pulse to remove the added inertia and direct the tracking mirror into tracking the next adjacent track without skipping one or more tracks before selecting a track for tracking.

In order to insure the optimum cooperation between the stop motion pulse from the generator 265 and the stop motion compensation pulse from the generator 267, a loop interrupt pulse is sent to the tracking servo to remove the differential tracking error signal from being applied to the tracking error amplifiers in tracking controller 67 during the period of time that the mirror is purposely caused to leave one track under direction of the stop motion pulse from the generator 265 and to settle upon a next adjacent track under the direction of the stop motion compensation pulse from the generator 267.

Using the arrangement described above, and assuming stop motion selector 261 passes the output from white flag detector 257 to gate 259, a stop motion effect is realized by causing the player to play two fields in repeated fashion, the first field starting after detection of a white flag occurring during the vertical interval following the second field, and the second field having no white flag preceding it. Accordingly, any time a stop motion command is given the player, the first and second fields of a selected frame will be displayed. A frame advance command to the player would result in the player skipping to the next frame, i.e., skipping two fields such that first field displayed is again initiated by a white flag during the vertical interval, following the second field and the second field without an initial white flag.

White flag wait function

It is often desirable to transmit information contained on a videodisc to an external using device. The device may be asynchronous with self clocking capabilites such that it is only necessary to transmit the information to the external device when it calls for it or when the transmitting device sends a precursor pulse to prepare the external equipment for the information to be transmitted immediately following such precursor.

The procedure for transmitting information from a videodisc would normally be to play or search to a certain frame number, perform an autostop at that frame number (i.e., enter a stop motion mode), and subsequently enter into a play mode such that at the start of the next frame, the vertical sync pulse will trigger transmission of the information to be transmitted to the external device. A problem arises, however, due to the fact that an autostop function replays two fields, it is not always predictable where the read beam will land in the autostop mode. As a result, the next vertical sync pulse could be at the end of the first field or at the end of the second field of the frame stopped on. Since the external equipment must not receive false information from the incorrect field, it is necessary to reliably establish which field is being played, so that transmission after second field (assuming that is the desire of the user) will be effectuated.

Figure 5 illustrates the waveforms needed to perform transmission of the data at the proper time. A vertical sync pulse on line 611 occurs between fields, as is known, and this is represented in Figure 5 by equally spaced pulses.

During alternate vertical intervals, a white flag signal 613 can be detected as was described in connection with white flag detector 257 in Figure 4. The data to be transmitted is shown on line 651 to begin at point B and lasts for four fields. The data to be transmitted may be video in nature, pulse code modulated audio, analog audio, or digital data on either the audio or video channels of the recorded program.

Stop motion is accomplished in the manner described in connection with Figure 4 and is shown on line 617 of Figure 5 in the form of still framing between points A and B.

For proper and effective transmission of the data on line 615, a transmit enable signal 619 must begin on the vertical sync pulse just prior to point B so as to give advanced indication to the external unit that data flow is about to start. A data flow gate 621 is then generated at the next vertical sync pulse (time B) and lasts for any preferred duration, and in the example given here for a period of four fields.

Figure 6 is a block diagram employed to implement the white flag wait function described in connection with the waveform analysis of Figure 5. Recalling again from Figure 1 the searching feature of the function generator 37, address recovery 29, and register 30, a search algorithm 629 is performed having received a target frame number on line 637 and a search enable command on 639. Assuming the search has been successful to find the target frame number, an output on line 643 causes the autostop algorithm 631 to perform its function of stop motion at the frame preceding the data to be transmitted. At the conclusion of the auto stop, i.e., after successful location and commencement of the still framing mode at the target track, a play command is routed to the tracking servo over line 633 to begin the play mode operation of the player.

From the video in line 635, white flag detector 257 extracts the white flag signal and outputs it over line 613 to white flag wait comparator 627. Thus, during the play mode of an autostop function, the next white flag will generate an output of comparator 627 over line 641, and this output is routed to the transmit enable pulse generator 623.

In the autostop mode, it can be appreciated by reference to Figure 5 that during the play portion of the still framing function, only the white flag immediately following point B will be detected since the read beam is kicked back from point B to point A due to the detection of the white flag occurring immediately following point B. Since white flags, as well as other vertical and horizontal timing signals are arranged radially of the disc, a jump back caused by a white flag at point B will place the read beam downstream of the white flag at point A. Thus, the signal from comparator 27 on line 641 must necessarily be the white flag following the vertical sync at point B. As a result, transmit enable pulse generator 623 is enabled by that white flag occurring immediately after point B, and, after kickback to point A, the next vertical sync pulse on line 611 produces an output on line 619 which begins at the next vertical sync pulse in time, and through the use of appropriate and known toggle flip-flop and gating, the transmit enable signal 619 will be terminated on the second next vertical sync pulse. As a result, a transmit enable pulse in the form of a window of time has been generated to span the vertical pulse occurring at point B. The transmit enable signal, together with the next vertical sync pulse in time from line 611 will create a data flow gate in block 625 which gates the data to be transmitted over line 615 to the external equipment. Again, depending upon the amount of time needed for transmission of the data, appropriate counters and gating can be arranged in a known manner to terminate the data flow pulse 621 at the proper time. In the instant case, a counter and gate structure allowing four fields of data to be transmitted is shown.

It can thus be seen that no matter what field the read beam lands in in the auto stop mode, initiation of the transmit enable pulse will not take place until after a white flag occurs during the normal play portion of the autostop function, and this "white flag wait" functioning insures proper transmission of the data coincident with the vertical sync pulse occurring at point B in Figure 5.

Claims

1. A method of transmitting intelligence information from a playback device to an external receiving device, said intelligence information being recorded in at least one video field of a video information signal recorded on a record medium, the video information signal being recovered by said video playback device, the video information further containing in part a sequence of vertical synchronization pulses occurring at a field rate, wherein a white flag identifies the end of the second field of a two-field per frame set, said method characterized by the steps of: searching for, locating, and playing a designated frame next preceding in time the video field containing at least the beginning of said intelligence information; detecting the next white flag signal occurring in time, said next white flag signal being the one associated with said designated frame; jumping back two fields responsive to detecting said next white flag signal; playing said two fields in a forward play mode; utilizing the next vertical synchronization pulse in time; after said jumping back two fields and during playing of said two fields, to generate a transmit enable pulse; utilizing the transmit enable pulse to generate a data flow enable gate signal at the coincidence of said transmit enable pulse and the next white flag signal occurring in time; and, gating said intelligence information to an external receiving device in response to said data flow enable gate signal.

2. The method as claimed in Claim 1, further including the step of terminating said transmit enable pulse with the next recurring vertical

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Claims

1. A method of transmitting intelligence information from a playback device to an external receiving device, said intelligence information being recorded in at least one video field of a video information signal recorded on a record medium, the video information signal being recovered by said video playback device, the video information further containing in part a sequence of vertical synchronization pulses occurring at a field rate, wherein a white flag identifies the end of the second field of a two-field per frame set, said method characterized by the steps of: searching for, locating, and playing a designated frame next preceding in time the video field containing at least the beginning of said intelligence information; detecting the next white flag signal occurring in time, said next white flag signal being the one associated with said designated frame; jumping back two fields responsive to detecting said next white flag signal; playing said two fields in a forward play mode; utilizing the next vertical synchronization pulse in time; after said jumping back two fields and during playing of said two fields, to generate a transmit enable pulse; utilizing the transmit enable pulse to generate a data flow enable gate signal at the coincidence of said transmit enable pulse and the next white flag signal occurring in time; and, gating said intelligence information to an external receiving device in response to said data flow enable gate signal.

2. The method as claimed in Claim 1, further including the step of terminating said transmit enable pulse with the next recurring vertical

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synchronization pulse occurring after the beginning of said data flow enable gate signal.

3. The method as claimed in Claim 1, further including the steps of: determining the field length of the intelligence information to be transmitted; detecting the vertical synchronization pulse coincident with the end of the last field containing said intelligence information; and, terminating said data flow enable gate signal in response to detecting the vertical synchronization pulse coincident with the end of the last field containing said intelligence information.

4. The method as claimed in Claim 1, wherein the external receiving device operates asynchronously with said video playback device.

5. The method as claimed in Claim 1, further including the step of sending said transmit enable pulse to said external receiving device.

6. Apparatus for transmitting intelligence information from a playback device to an external receiving device, said intelligence information (615) being recorded in at least one video field of a video information signal recorded on a record medium (13), the video information being recovered by said video playback device, the video information further containing in part a sequence of vertical synchronization pulses (611) occurring at a field rate, wherein a complete picture frame is defined by two adjacent fields, and wherein an end-of-frame signal (619) identifies the end of the second field of each two field per frame set, said apparatus characterized by player means for searching for, locating, and playing a designated frame next preceding in time the video field containing at least the beginning of said intelligence information; means for detecting the next end-of-frame signal in time, said next end-of-frame signal being the one associated with said designated frame; means for jumping back two fields responsive to detecting said next end-of-frame signal: means for playing said two fields in a forward play mode; means (623) responsive to detection of the next vertical synchronization pulse in time, after said jumping back two fields and during playing of said two fields, for generating a transmit enable pulse; means (625) responsive to the transmit enable pulse for generating a data flow enable gate signal at the coincidence of said transmit enable pulse and the next end-of-frame signal occurring in time; and, gate means (625) responsive to said data flow enable gate signal for gating said intelligence information to the external receiving device.

7. The apparatus as claimed in Claim 6, further including means (623) for terminating said transmit enable pulse upon detection of the next vertical synchronization pulse occurring after the beginning of said data flow enable gate signal.

8. The apparatus as claimed in Claim 6, further including: means for determining the field length of the intelligence information to be transmitted; and, means for terminating said data flow enable gate signal concurrently with the vertical synchronization pulse coincident with the end of the last field containing said intelligence information.

9. The apparatus as claimed in Claim 6, wherein the external receiving device operates asynchronously with said video playback device.

10. The apparatus as claimed in Claim 6, wherein said end-of-frame signal comprises a white flag signal.

Patentansprüche

1. Verfahren zur Übertragung von Nachrichten von einem Rückspielgerät zu einem äußeren Empfangsgerät, wobei die Nachrichten in wenigstens einem auf einem Aufzeichnungsträger aufgezeichneten Videofeld eines Video-Informationssignals aufgezeichnet sind, das von dem Video-Rückspielgerät wiedergewonnen wird, und wobei die Video-Informationen ferner zum Teil eine Folge von bei einer Bildwechselfrequenz erschneidenden, vertikalen Synchronisierimpulsen enthalten und ein weißer Anzeiger das Ende des zweiten Feldes eines Satzes aus zwei Feldern je Bild festlegt, gekennzeichnet durch die Arbeitsschritte, ein bezeichnetes Bild zu suchen, örtlich zu bestimmen und abzuspielen, das als nächstes zeitlich dem Videofeld vorangeht, welches mindestens den Beginn der Nachricht enthält, das zeitlich als nächstes auftretende Signal des weißen Anzeigers wahrzunehmen, das dem bezeichneten Bild zugeordnet ist, entsprechend der Wahrnehmung des nächsten Signals des weißen Anzeigers zwei Felder zurückzuspringen, die beiden Felder in Vorwärtsrichtung abzuspielen, während dieses Abspielvorganges rechtzeitig den nächsten vertikalen Synchronisierimpuls zur Erzeugung eines die Übertragung ermöglichenden Impulses und diesen zur Erzeugung eines Schaltsignals für den Datenfluß bei einem Zusammentreffen mit dem die Übertragung ermöglichenden Impuls und dem rechtzeitig auftretenden, nächsten Signal des weißen Anzeigers zu benutzen und entsprechend dem Schaltsignal für den Datenfluß die Nachrichten zu einem äußeren Empfangsgerät hindurchgehen zu lassen.

2. Verfahren, wie im Anspruch 1 beansprucht, bei dem ferner der die Übertragung ermöglichende Impuls mit dem nächsten sich wiederholenden, vertikalen Synchronisierimpuls beendet wird, der nach dem Beginn des Schaltsignals für den Datenfluß auftritt.

3. Verfahren, wie im Anspruch 1 beansprucht, bei dem ferner die Feldlänge der zu übertragenden Nachrichten bestimmt wird, der vertikale Synchronisierimpuls wahrgenommen wird, der mit dem Ende des letzten, die Nachrichten enthaltenden Feldes zusammentrifft, und das Schaltsignal für den Datenfluß entsprechend der Wahrnehmung des vertikalen Synchronisierimpulses beendet wird, der mit dem Ende des letzten, die Nachrichten enthaltenden Feldes zusammenfällt.

4. Verfahren, wie im Anspruch 1 beansprucht, bei dem das äußere Empfangsgerät asynchron zu dem Video-Rückspielgerät betrieben wird.

5. Verfahren, wie im Anspruch 1 beansprucht, bei dem ferner der die Übertragung ermöglichende Impuls dem äußeren Empfangsgerät gesendet wird.

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6. Anlage zur Übertragung von Nachrichten aus einem Rückspielgerät zu einem äußeren Empfangsgerät, wobei die Nachrichten (615) in mindestens einem Videofeld eines auf einem Aufzeichnungsträger (13) aufgezeichneten Video-Informationssignals aufgezeichnet sind und die aus dem Video-Rückspielgerät wiedergewonnene Video-Information ferner zum Teil eine Folge von vertikalen, bei einer Feldwechselzahl erscheinenden Synchronisierimpulsen (611) enthält, und wobei ein vollständiges Bild durch zwei benachbarte Felder definiert ist und ein den Abschluß eines Bildes angebendes Signal (619) das Ende des zweiten Feldes in dem Satz aus zwei Feldern je Bild festlegt, gekennzeichnet durch Abspielhilfsmittel zum Suchen, Auffinden des Ortes und zum Abspielen eines bezeichneten Bildes, das als nächstes zeitlich dem Videofeld vorangeht, das mindestens den Beginn der Nachricht enthält, durch Hilfsmittel zur rechtzeitigen Wahrnehmung des nächsten, ein Ende des Bildes angebenden Signals, das dem bezeichneten Bild zugeordnet ist, durch Hilfsmittel zum Rückspringen um zwei Felder bei Wahrnehmung des nächsten, das Ende des Bildes angebenden Signals, durch Hilfsmittel zum Abspielen der beiden Felder in der Vorwärtsrichtung, durch Hilfsmittel (623) zur Erzeugung eines die Übertragung ermögliechenden Impulses, die nach dem Rückspringen über zwei Felder und während des Abspielens der beiden Felder auf eine rechtzeitige Wahrnehmung des nächsten vertikalen Synchronisierimpulses ansprechen, durch Hilfsmittel (625) zur Erzeugung eines Schaltsignals für den Datenfluß bei dem Zusammentreffen des die Übertragung ermöglichenden Impulses mit dem nächsten, rechtzeitig erscheinenden, das Ende eines Bildes angebenden Signal und durch Verknüpfungsschaltungen (625), die auf das Schaltsignal für den Datenfluß ansprechen, um die Nachricht zu dem äußeren Empfangsgerät hindurchgehen zu lassen.

7. Anlage, wie im Anspruch 6 beansprucht, die ferner Hilfsmittel (623) zur Beendigung des die Übertragung ermöglichenden Impulses bei der Wahrnehmung des nächsten vertikalen Synchronisierimpulses enthalten, der nach dem Beginn des Schaltsignals für den Datenfluß auftritt.

8. Anlage, wie im Anspruch 6 beansprucht, die ferner Hilfsmittel zur Bestimmung der Feldlänge der zu übertragenden Nachricht und Hilfsmittel zur Beendigung des Schaltsignals für den Datenfluß gleichzeitig mit dem vertikalen Synchronisierimpuls beim Zusammentreffen mit dem Ende des letzten Feldes enthalten, das die Nachricht enthält.

9. Anlage, wie im Anspruch 6 beansprucht, bei der das äußere Empfangsgerät asynchron mit dem Video-Rückspielgerät betreibbar ist.

10. Anlage, wie im Anspruch 6 beansprucht, bei der das das Ende eines Bildes angebende Signal ein einen weißen Anzeiger darstellendes Signal ist.

Revendications

1. Procédé de transmission d'information de communication à partir d'un dispositif de reproduction vers un dispositif de réception externe, ladite information de communication étant enregistrée dans au moins une zone vidéo d'un signal d'information vidéo enregistré sur un support d'enregistrement, le signal d'information vidéo étant recueilli par ledit dispositif de reproduction vidéo, l'information vidéo contenant en outre en partie une séquence d'impulsions de synchronisation verticale apparaissant à une vitesse de zone, dans lequel un indicateur blanc identifie l'extrémitié de la seconde zone d'un ensemble de deux zones par cadre, ledit procédé étant caractérisé par les étapes de: rechercher, localiser, et reproduire un cadre désigné précédant ensuite en cadence la zone vidéo contenant au moins le début de ladite information de communication; détecter le signal indicateur blanc suivant apparaissant en cadence; ledit signal indicateur blanc suivant étant celui associé audit cadre désigné; sauter en arrière deux zones sensibles à la détection dudit signal indicateur blanc suivant; reproduire lesdites deux zones dans un mode de reproduction vers l'avant; utiliser l'impulsion de synchronisation verticale suivante en cadence, après ledit saut en arrière de deux zones et au cours de la reproduction desdites deux zones, pour produire une impulsion de commande de transmission; utiliser l'impulsion de commande de transmission pour produire un signal de déclenchement périodique de commande de flux de données à la coïncidence de ladite impulsion de commande de transmission et du signal indicateur blanc suivant apparaissant en cadence; et de diriger ladite information de communication vers un dispositif de réception externe en réponse audit signal de déclenchement périodique de commande de flux de données.

2. Procédé selon la revendication 1, comprenant en outre l'étape de terminer ladite impulsion de commande de transmission avec l'impulsion de synchronisation verticale récurrente suivante apparaissant après le début dudit signal de déclenchement périodique de commande de flux de données.

3. Procédé selon la revendication 1, comprenant en outre les étapes de: déterminer la longueur de zone de l'information de communication à transmettre; de détecter l'impulsion de synchronisation verticale qui coïncide avec l'extrémité de la dernière zone contenant ladite information de communication; et de terminer ledit signal de déclenchement périodique de commande de flux de données en réponse à la détection de l'impulsion de synchronisation verticale coïncidant avec l'extrémité de la dernière zone contenant ladite information de communication.

4. Procédé selon la revendication 1, dans lequel le dispositif de réception externe fonctionne de façon asynchrone avec ledit dispositif de reproduction vidéo.

5. Procédé selon la revendication 1, compre-

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nant en outre l'étape d'envoyer ladite impulsion de commande de transmission audit dispositif de réception externe.

6. Apparil pour transmettre une information de communication depuis un dispositif de reproduction vers un dispositif de réception externe, ladite information de communication (615) étant enregistrée dans au moins une zone vidéo d'un signal d'information vidéo enregistré sur un support d'enregistrement (13), l'information vidéo étant recueillie par ledit dispositif de reproduction vidéo, l'information vidéo contenant en outre en partie une séquence d'impulsions de synchronisation verticale (611) apparaissant à une vitesse de zone, dans lequel un cadre d'image complet est défini par deux zones adjacentes, et dans lequel un signal de fin de cadre (619) identifie la fin de la seconde zone d'une paire de zones par ensemble de cadre, ledit appareil étant caractérisé par un moyen de reproduction pour rechercher, localiser et reproduire un cadre désigné précédant ensuite en cadence la zone vidéo contenant au moins le début de ladite information de communication; un moyen pour détecter le signal de fin de cadre suivant en cadence, ledit signal de fin de cadre suivant étant celui associé audit cadre désigné; un moyen pour sauter en arrière deux zones sensible à la détection dudit signal fin de cadre suivant; un moyen pour reproduire lesdites deux zones dans un mode de reproduction en avant; un moyen (623) sensible à la détection de l'impulsion de synchronisation verticale suivante en cadence, après ledit saut en arrière de deux zones et au cours de la reproduction desdites deux zones, pour produire une impulsion de commande de transmission; un moyen (625) sensible à l'impulsion de commande de transmission pour produire un signal de déclenchement périodique de commande de flux de données à la coïncidence de ladite impulsion de commande de transmission et dudit signal de fin de cadre suivant apparaissant en cadence; et un moyen de déclencehement périodique (625) sensible audit signal de déclenchement périodique de commande du flux de données pour diriger ladite information de communication vers le dispositif de réception externe.

7. Appareil selon la revendication 6, comprenant en outre un moyen (623) pour terminer ladite impulsion de commande de transmission lors de la détection de l'impulsion de synchronisation verticale suivante apparaissant après le début dudit signal de déclenchement périodique de commande de flux de données.

8. Appareil selon la revendication 6, comprenant en outre: un moyen pour déterminer la longueur de zone de l'information de communication à transmettre; et un moyen pour terminer ledit signal de déclenchement périodique de commande de flux de données concurremment avec ladite impulsion de synchronisation verticale coïncidant avec la fin de la dernière zone contenant ladite information de communication.

9. Appareil selon la revendication 6, dans lequel le dispositif de réception externe fonction de façon asynchrone avec ledit dispositif de reproduction vidéo.

10. Appareil selon la revendication 6, dans lequel ledit signal de fin de cadre comprend un signal d'indicateur blanc.

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