Description

The present invention relates to an apparatus for displaying video signals of a first format on a smaller screen according to the preamble of claim

An apparatus of this kind is known from GB-A-21 73 669. This apparatus as a whole is located at a transmitter side and the video signals are transmitted from the transmitter to a receiver in the second format.

In this apparatus the analog-to-digital converter means generates a sequence of a possible number of samples for each horizontal line of the first format having a defined number of lines. This sequence is stored in memory means in the form of shift registers and read out from the shift registers into a multiplexer for a time-compression of said sequence, which defines a time slot whithin a horizontal line intervall for receiving the time-compressed information. The output signal from the multiplexer is applied to the digital-to-analog converter means and the output signal of this digital-to-analog converter means is a time-compressed signal for a conversion into a video signal having a format that presents a narrower aspect ratio than the first format.

GB-A-21 40 243 shows a field/frame memory, which serves for selecting an effective picture display and allows and expanding or reducing of the display format, the number of lines etc.

In order to provide a higher resolution than that achieved with the existing standard television systems, a high definition television (HDTV) system has been developed in which the number of horizontal scanning lines in each field or frame is increased and the frequency band of the video signal is widened, and such high definition television system is now being perfected and made practical. Thus, for example, a standard NTSC television receiver employs 525 horizontal scanning lines and the frequency band of the NTSC luminance signal is 4.2 MHz, while the HDTV television receiver employs 1125 horizontal scanning lines and the HDTV luminance signal has a frequency band of 20 MHz.

Furthermore, although the aspect ratio of the picture screen of the existing standard NTSC television receiver, that is, the ratio of its horizontal dimension to its vertical dimension, is 4:3, the corresponding aspect ratio of the picture screen of the HDTV television receiver has been selected to be 16:9, or approximately 5:3. Therefore, even if a so-called scan-converter is employed for changing the number of the horizontal scanning lines in a received HDTV television signal to correspond with the 525 horizontal scanning lines used in the standard NTSC television receiver, the different aspect ratios of the picture displays according to the HDTV and NTSC formats give rise to problems in displaying the scan-converted HDTV video signal on the screen of a standard NTSC television monitor receiver.

As shown for example on Fig. 1A, in order to display, on the picture screen of an NTSC television monitor receiver represented in full lines and having the aspect ratio of 4:3, the full picture corresponding to an HDTV video signal intended to be displayed on the picture screen of an HDTV television receiver having an aspect ratio which, for the sake of simplicity, is assumed to be 5:3, as represented by the dotted lines on Fig. 1A, it has been proposed to subject the HDTV video signal to a picture conversion in which the time base of the video signal is compressed to 4/5th of its original value and the number of horizontal scanning lines is converted from 1125 to 525. However, when such previously proposed picture conversion is effected, the resulting displayed picture is vertically elongated as shown in Fig. 1A so that the displayed picture is unnatural or distorted.

On the other hand, if the HDTV video signal is subjected to a picture conversion in which, while the HDTV aspect ratio of 5:3 is maintained, the picture size is reduced so as to have a horizontal size no greater than that of the picture screen of an NTSC television monitor receiver on which the HDTV video signal is to be displayed, as shown on Fig. 1B, distortion of the picture is avoided, but upper and lower portions of the picture screen are left blank or black, as indicated by the shaded areas. Such blank or black upper and lower portions of the picture screen each correspond to approximately 1/10th the vertical dimension of the picture screen. Thus, of the 525 horizontal scanning lines of the standard NTSC television monitor or receiver, only about 450 horizontal scanning lines are used to form the effective picture area in Fig. 1B. Consequently, although the previously proposed arrangement illustrated in Fig. 1B avoids picture distortion, it does so at the expense of substantially degrading the enhanced vertical resolution which is one of the desirable features of the HDTV system.

In order to avoid both the picture distortion of Fig. 1A and the degraded vertical resolution of Fig. 1B, it has been proposed to display a HDTV video signal as a natural looking image, for example, as shown on Fig. 1C. In accordance with the proposal illustrated by Fig. 1C, left- and right-hand side portions of the picture that would be displayed on the picture screen of an HDTV television receiver, that is, a picture screen having an aspect ratio of 5:3 as shown in dotted lines on Fig. 1C, in response to an HDTV video signal, are omitted when such video signal is displayed on the picture

screen of an NTSC television monitor receiver having an aspect ratio of 4:3, and which is represented in full lines on Fig. 1C. In this case, however, if the right- and left-hand side portions of the HDTV television picture contain important video information, such video information will be omitted from the picture displayed on the picture screen of the standard NTSC television monitor receiver and cannot be observed or displayed.

Accordingly, it is an object of this invention to provide an apparatus for converting received video signals of a first format, for example, the HDTV format, which has a first number of horizontal scan lines and a picture display of a first aspect ratio, to video signals of a second format, for example, the NTSC format, which has a second or different number of horizontal scan lines and a picture display of a different aspect ratio, and which avoids the above mentioned disadvantages or problems inherent in the proposals of the prior art.

More specifically, it is an object of this invention to provide an improved apparatus, as aforesaid, for defining an effective picture area of a HDTV video signal so as to make effective use of the video data contained therein when such HDTV video signal is displayed on the picture screen of an NTSC or other conventional television monitor receiver having an aspect ratio different from that of the picture display in the HDTV format.

Another object of this invention is to provide an apparatus, as aforesaid, for defining an effective picture area of an HDTV video signal which is displayed on the picture screen of a television monitor receiver having an aspect ratio different from that of the picture display in the HDTV format, and in which the portion or portions of the picture area not displayed by reason of the difference in aspect ratios may be varied for ensuring the display of all important video information at any time.

Still another object of this invention is to provide an apparatus, as aforesaid, in which the portion of the HDTV video signal which is displayed is, at all times, free of distortion, and further in which degradation of the vertical resolution is avoided beyond that inherent in the reduction of the number of horizontal scanning lines of the HDTV video signal to the number characteristic of the NTSC or other conventional television monitor receiver on which the picture is displayed.

The invention is defined in claim 1. Preferred and advantageous configurations of this invention are defined in claims 2 to 9. In this connection it is to be noted that WO-A-8 605 644 or GB-A-20 97 220 show a manual controlling of the display window on the transmission and not at the receiving side.

According to an aspect of the present invention, an apparatus for converting video signals of a first format, which has a first number of horizontal scanning lines in a field and a picture display of a first aspect ratio, to video signals of a second format, which has a second number of horizontal scanning lines in a field and a picture display of a second aspect ratio, comprises: means for receiving video signals of the first format, analog-to-digital converter means for converting the video signals of the first format to digital video signals, memory means having addresses capable of storing at least a field of the digital video signals of the first format, means for writing the digital video signals at the addresses of the memory means, means for reading from the addresses of the memory means less samples of the digital video signals than have been written in the memory means, digital-to-analog converter means for converting the digital video signals read from the memory means into analog video signals of the second format, and controlling means for variably determining a start address of the addresses from which video signal data are read from the memory means. In the case where the first aspect ratio is larger than the second aspect ratio, the selection of the start address for reading from the memory means determines the portion or portions of the picture display of the first aspect ratio omitted at least at one side or both sides, respectively, of the picture display of the second aspect ratio. Thus, by varying such start address while observing the displayed picture, it is possible to ascertain whether the omitted portion or portions of the picture display of the first aspect ratio contains important video information.

The above, and other objects, features and advantages of the present invention, will be apparent in the following detailed description of an illustrative embodiment which is to be read in conjunction with the accompanying drawings, wherein the same reference numerals are employed to identify the same or similar elements.

Figs. 1A, 1B and 1C are schematic illustrations of the picture screens of television monitor receivers, and illustrate the types of picture displays provided by respective conversion systems of the prior art;

Fig. 2 is a block diagram showing an apparatus according to an embodiment of the present invention for defining an effective area of an HDTV video picture to be displayed on the picture screen of a television monitor receiver according to a different format; and

Figs. 3A, 3B and 3C are schematic representations of the picture screen of a television monitor receiver, for example, of the NTSC format, when displaying different effective areas of HDTV video signals determined by the apparatus of Fig. 2.

As shown in Fig. 2, an apparatus according to an embodiment of this invention for converting an HDTV video signal to a video signal of an existing standard format, for example, an NTSC video signal, generally comprises an HDTV video signal receiving device 1, an analog-to-digital (A/D) converter 2, a synchronizing signal extracting circuit 3, a write signal processing circuit 4, a memory control circuit 5, a memory 6, a read signal processing circuit 7 and a digital-to-analog (D/A) converter 8.

The memory control circuit 5, which may be constituted by a microcomputer, is shown to include a timing control portion 9 generating control signals for the writing and reading of video data of one frame in and from the memory 6, a write clock signal generator 10 for generating a write clock signal under the control of the timing control portion 9, and a read clock signal generator 11 for generating a read clock signal under the control of the timing control portion 9.

A start address control circuit 12 is provided with a suitable connection to the timing control portion 9 for determining the start address of a read clock signal provided from the timing control portion 9 to the memory 6. Such start address control circuit 12 varies the start address of the read clock signal applied to the memory 6 in response to a picture position determining signal applied to the start address control circuit 12 by a manually actuable joy stick 13A or by a remote controller 13B.

The position of the picture displayed on the picture screen of a television monitor receiver can be further determined or varied by manual operation of picture position selecting buttons 15A and 15B of such television monitor receiver which are connected to the start address control circuit 12.

The above described apparatus shown in Fig. 2 operates as follows:

An HDTV television signal broadcast by a satellite and received at a suitable antenna (not shown), or received through a cable television (CATV) system, is converted to a video signal by the HDTV receiving device 1. Such HDTV video signal is supplied to the A/D converter 2 in which it is converted from its original analog form to a digital video signal. Synchronizing information contained in the video signal derived from the HDTV receiving device 1 is extracted by the synchronizing signal extracting circuit 3 and supplied from the latter to the timing control portion 9 of the memory control circuit 5. The video signal from HDTV receiving device 1 is sampled by the A/D converter 2 under the control of the timing control portion 9, for example, at a sampling frequency of 38.234 MHz, so as to provide 1134 samples for each horizontal line of the HDTV video signal which has 1125 horizontal lines per frame. The video data representing the effective picture area are sequentially stored or written by the write control signal processing circuit 4 in 1134 memory portions or addresses provided in the memory 6 for each of the 1125 horizontal lines included in a frame of the video signal of the HDTV system. Thus, the memory 6 has a capacity sufficient to store at least a frame of the HDTV video signal corresponding to a displayed picture having an aspect ratio, that is, a ratio of its horizontal dimension to its vertical dimension, of approximately 5:3.

In the example being described, that is, when the HDTV video signal having an aspect ratio of 5:3 is to be converted into a video signal for display on a picture screen having an aspect ratio of 4:3, the frequency of the read clock signal for the memory 6 is selected to be 14.318 MHz, which is 4 x f_{sc},where f_{sc} is the sub-carrier frequency of the NTSC system. With such read clock signal frequency of 14.318 MHz, 910 samples of video or image data are read from the memory 6 during each horizontal period of the NTSC system, that is, during each of the 525 horizontal scanning lines occurring during each of the 30 frames per second of the NTSC format. Thus, the number of video or image data or samples read from the memory 6 during each horizontal period is approximately equal to 4/5th (910/1134) the number of samples or image data written in the memory 6 during each horizontal period of the incoming HDTV signal, with the result that the horizontal dimension of the television picture is reduced to 4/5th of its original size. Accordingly, the aspect ratio 5:3 of the original HDTV picture display is changed to the aspect ratio 4:3 of the picture display according to the NTSC format.

Although 1125 horizontal lines are directly read out from the memory 6, such 1125 horizontal lines are converted to 525 horizontal lines forming one frame according to the NTSC format by the read signal processing circuit 7. Such conversion of the number of horizontal lines from the 1125 lines per frame of the HDTV system to the 525 lines per frame of the NTSC system can be effected in a well known manner, for example, by a so-called line interpolation method which is known for the conversion between the NTSC and PAL systems, or as is disclosed, for example, in Japanese Patent Publication No. 59/104866.

In accordance with the line interpolation method, a vertical digital filter or the like is employed for forming 525 horizontal line signals from the 1125 horizontal line signals read from the memory 6, with the intervals between the resulting 525 horizontal line signals being as nearly equal to each other as is possible.

Accordingly, when the digital video signal derived from the read signal processing circuit 7 is

converted to an analog signal by the D/A converter 8, the resulting video signal has 525 horizontal scanning lines per frame. Further, each such horizontal line contains video signal components corresponding to 910 of the 1134 samples of video or image data comprising each horizontal line of the HDTV video signal written in the memory 6. Upon the addition of horizontal and vertical synchronizing signals to the output from the D/A converter 8, there is derived from the apparatus embodying this invention video signals which can be applied to a conventional television monitor receiver for displaying thereon a picture having an aspect ratio of 4:3 which is characteristic of the NTSC system for which such conventional television monitor receiver is originally adapted.

It will be appreciated that, in reading out only 910 samples of the 1134 samples written in the memory 6 for each horizontal line of the HDTV video signal, the remaining 224 samples of each horizontal line of the HDTV video signal are not produced. In accordance with the present invention, the position or positions, in the horizontal direction, of the image data or samples which are not produced can be variably determined or selected by a signal derived from the start address control circuit 12. For example, if the picture position determining signal applied from circuit 12 to the timing control portion 9 of the memory control circuit 5 directs that the image data is to be read out from the address "0" in the memory 6 corresponding to the horizontal position on the picture indicated at a on Fig. 3A, then the image data which is not produced or read out from the memory 6 for each horizontal line will be the 224 samples constituting the right hand end portion of each horizontal line written in the memory 6. As a result of the foregoing, and as shown on Fig. 3A, a right-hand side portion H_A corresponding, in the horizontal direction, to 224 image data samples, of the HDTV picture display having the aspect ratio of 5:3 is omitted from the picture actually displayed on the screen of the NTSC television monitor receiver having the aspect ratio of 4:3. In other words, the entire HDTV picture, with the exception of its right-hand side portion H_A, is without distortion displayed on the screen of the NTSC television monitor receiver.

In the previously described apparatus according to an embodiment of the present invention, the read start address determined by the circuit 12 can be selected to be anywhere in the range from "0" to "224" in response to suitable actuation of the joy stick 13A or the remote controller 13B. For example, if the read start address is selected to be "112" which corresponds to the position indicated at b on Fig. 3B, the picture displayed on the NTSC television monitor screen having the aspect ratio of 4:3 is substantially centered in respect to the HDTV picture display having the aspect ratio of 5:3. By reason of the foregoing, relatively narrow left-hand and right-hand side portions H_{B1} and H_{B2} of the HDTV picture are omitted from the picture display on the picture screen of the NTSC television monitor receiver.

Furthermore, if the read start address is selected to be "224" which corresponds to the position indicated at c on Fig. 3C, only the left-hand side portion H_C of the HDTV picture display is omitted from the picture displayed on the picture screen of the NTSC television monitor receiver.

Thus, when a HDTV video signal is received by the apparatus embodying this invention for reproduction or display by an NTSC or other conventional standard television monitor receiver, the joy stick 13A or the remote controller 13B is actuated for varying the read start address between the extremes indicated at a and c on Figs. 3A and 3C, respectively, while observing the content of the displayed picture so as to permit selection of a read start address at which important video information appearing at the left-hand or right-hand side portion of the picture is included in the actual picture displayed on the screen of the NTSC or other conventional television monitor receiver.

Of course, the present invention is not limited in its application to the display of HDTV video signals on NTSC television monitor receivers, but can be similarly applied to the display of the high definition video signals on television monitor receivers according to the PAL and SECAM systems, respectively. In each of those cases, the television monitor receiver has an aspect ratio different from that of the HDTV system, and the picture conversion apparatus according to the present invention makes it possible to select for actual display on the picture screen of the television monitor receiver that portion of the HDTV picture display which contains the desired video information, while ensuring that the displayed picture will be free of distortion.

Although the embodiment of the present invention described above with reference to Fig. 2 of the drawings employs a single frame memory 6 into which all of the image data corresponding to a frame of the HDTV video signal is written, it is possible in accordance with the present invention to separate the image data into a luminance signal component and a chroma signal component which are written in two respective frame memories from which the reading is controlled in a manner similar to that described above with reference to the single memory 6.

By way of summary, it will be seen that the apparatus according to the present invention defines an effective picture area of a HDTV picture to be displayed on the screen of a television monitor

receiver having a different aspect ratio by selecting the position, in the horizontal direction, of the start address at which the HDTV video data stored in the memory 6 is read therefrom for forming the actually displayed picture. Thus, when converting a video signal from one system to another system having a different aspect ratio, the portion or portions of the original picture display to be omitted due to a difference between the aspect ratios can be selectively changed for ensuring that important video information is not lost and, at the same time, avoiding distortion of the portion of the original picture which is displayed.

Claims

1. Apparatus for converting video signals of a first format, which has a first number of horizontal scanning lines in a field and a picture display of a first aspect ratio, to video signals of a second format, which has a second number of horizontal scanning lines in a field and a picture display of a second aspect ratio, said apparatus providing
   - means (1) for receiving video signals of said first format;
   - analog-to-digital converter means (2) for converting said video signals of said first format to digital video signals;
   - memory means (6) capable of storing said digital video signals of said first format;
   - means (4) for writing said digital video signals into said memory means (6);
   - means (7) for reading from said memory means (6) less samples of said digital video signals than have been written in said memory means;
   - digital-to-analog converter means (8) for converting the digital video signals read from said memory means (6) into analog video signals of said second format; and
   - controlling means (9, 12, 13A, 13B, 15A, 15B) for variably determining a time slot for reading said memory means;

   characterized in that
   - said video signals being transmitted in said first format from a transmitter to a receiver;
   - said apparatus, containing said receiving means (1), said analog-to-digital converter means (2), said memory means (6), said writing means (4), said reading means (7), said digital-to-analog converter means (8) and said controlling means (9, 12, 13A, 13B, 15A, 15B), is located as a whole at the receiver side to receive said transmitted video signals of said first signal;
   - said memory means (6) having addresses capable of storing at least a field of said digital video signal;
   - said controlling means (9, 12, 13A, 13B, 15A, 15B) variably determines a start address of said addresses of the memory means (6) read by said means (7) for reading;

     and
   - said controlling means (9, 12, 13A, 13B, 15A, 15B) includes manual controlling means (13A, 13B; 15A, 15B) for manually controlling said start address.

2. An apparatus according to claim 1, in which said first and second aspect ratios are each the ratio of the horizontal dimension to the vertical dimension of the respective picture display, and said first aspect ratio is larger than said second aspect ratio so that said start address determines a portion of the picture display of said first aspect ratio which is omitted at least at one side of said picture display of said second aspect ratio.

3. An apparatus according to claim 1 or 2; further comprising line number converting means connected between said memory means (6) and said digital-to-analog converter means (8) for converting the number of lines in a field of said digital video signals read from said memory means (6) from said first number to said second number.

4. An apparatus according to anyone of the claims 1 to 3; in which said manual controlling means includes a remote controll (15B).

5. An apparatus according to anyone of the claims 1 to 4; in which said manual controlling means is in the form of a joy stick (13A).

6. An apparatus according to claim 1, in which each of said first and second aspect ratios is the ratio of the horizontal dimension to the vertical dimension of the respective picture display, and said first aspect ratio is larger than said second aspect ratio.

7. An apparatus according to claim 6; in which said first aspect ratio is 16:9 or 5:3 and said second aspect ratio is 4:3.

8. An apparatus according to claim 7; in which said first format has 1125 horizontal scanning lines in a frame and said second format has 525 horizontal scanning lines in a frame.

receiver having a different aspect ratio by selecting the position, in the horizontal direction, of the start address at which the HDTV video data stored in the memory 6 is read therefrom for forming the actually displayed picture. Thus, when converting a video signal from one system to another system having a different aspect ratio, the portion or portions of the original picture display to be omitted due to a difference between the aspect ratios can be selectively changed for ensuring that important video information is not lost and, at the same time, avoiding distortion of the portion of the original picture which is displayed.

Claims

1. Apparatus for converting video signals of a first format, which has a first number of horizontal scanning lines in a field and a picture display of a first aspect ratio, to video signals of a second format, which has a second number of horizontal scanning lines in a field and a picture display of a second aspect ratio, said apparatus providing
   - means (1) for receiving video signals of said first format;
   - analog-to-digital converter means (2) for converting said video signals of said first format to digital video signals;
   - memory means (6) capable of storing said digital video signals of said first format;
   - means (4) for writing said digital video signals into said memory means (6);
   - means (7) for reading from said memory means (6) less samples of said digital video signals than have been written in said memory means;
   - digital-to-analog converter means (8) for converting the digital video signals read from said memory means (6) into analog video signals of said second format; and
   - controlling means (9, 12, 13A, 13B, 15A, 15B) for variably determining a time slot for reading said memory means;

   characterized in that
   - said video signals being transmitted in said first format from a transmitter to a receiver;
   - said apparatus, containing said receiving means (1), said analog-to-digital converter means (2), said memory means (6), said writing means (4), said reading means (7), said digital-to-analog converter means (8) and said controlling means (9, 12, 13A, 13B, 15A, 15B), is located as a whole at the receiver side to receive said transmitted video signals of said first signal;
   - said memory means (6) having addresses capable of storing at least a field of said digital video signal;
   - said controlling means (9, 12, 13A, 13B, 15A, 15B) variably determines a start address of said addresses of the memory means (6) read by said means (7) for reading;

     and
   - said controlling means (9, 12, 13A, 13B, 15A, 15B) includes manual controlling means (13A, 13B; 15A, 15B) for manually controlling said start address.

2. An apparatus according to claim 1, in which said first and second aspect ratios are each the ratio of the horizontal dimension to the vertical dimension of the respective picture display, and said first aspect ratio is larger than said second aspect ratio so that said start address determines a portion of the picture display of said first aspect ratio which is omitted at least at one side of said picture display of said second aspect ratio.

3. An apparatus according to claim 1 or 2; further comprising line number converting means connected between said memory means (6) and said digital-to-analog converter means (8) for converting the number of lines in a field of said digital video signals read from said memory means (6) from said first number to said second number.

4. An apparatus according to anyone of the claims 1 to 3; in which said manual controlling means includes a remote controll (15B).

5. An apparatus according to anyone of the claims 1 to 4; in which said manual controlling means is in the form of a joy stick (13A).

6. An apparatus according to claim 1, in which each of said first and second aspect ratios is the ratio of the horizontal dimension to the vertical dimension of the respective picture display, and said first aspect ratio is larger than said second aspect ratio.

7. An apparatus according to claim 6; in which said first aspect ratio is 16:9 or 5:3 and said second aspect ratio is 4:3.

8. An apparatus according to claim 7; in which said first format has 1125 horizontal scanning lines in a frame and said second format has 525 horizontal scanning lines in a frame.

* C L M S *

9. An apparatus according to claim 8; in which said memory means is a frame memory.

Patentansprüche

1. Vorrichtung zum Konvertieren von Videosignalen eines ersten Formats, das eine erste Anzahl von horizontalen Abtastzeilen in einem Teilbild und eine Bildanzeigeeinheit mit einem ersten Bildseitenverhältnis hat, in Videosignale eines zweiten Formats, das eine zweite Anzahl von horizontalen Abtastzeilen in einem Teilbild und eine Bildanzeigeeinheit mit einem zweiten Bildseitenverhältnis hat, wobei die Vorrichtung vorsieht

   Mittel (1) zum Empfang von Videosignalen des ersten Formats;

   Analog-Digital-Konverter-Mittel (2) zum Konvertieren der Videosignale des ersten Formats in digitale Videosignale;

   Speichermittel (6), die digitale Videosignale des ersten Formats speichern können;

   Mittel (4) zum schreiben der digitalen Videosignale in die Speichermittel (6);

   Mittel (7) zum Lesen von wenigeren Proben der digitalen Videosignale, als in die Speichermittel eingeschrieben sind, aus den Speichermitteln (6);

   Digital-Analog-Konverter-Mittel (8) zum Konvertieren der aus den Speichermitteln (6) gelesenen digitalen Videosignale in analoge Videosignale des zweiten Formats; und

   Steuermittel (9, 12, 13A, 15A, 15B) zur variablen Bestimmung eines Zeitschlitzes, um die Speichermittel zu lesen;

   dadurch gekennzeichnet, daß

   die Videosignale im ersten Format von einem Sender zu einem Empfänger übertragen werden;

   die Vorrichtung, welche die Empfangsmittel (1) enthält, die Analog-Digital-Konverter-Mittel (2), die Speichermittel (6), die Schreibmittel (4), die Lesemittel (7), die Digital-Analog-Konverter-Mittel (8) und die Steuermittel (9, 12, 13A, 13B, 15A, 15B) gänzlich auf der Empfängerseite angeordnet sind, um die gesendeten Videosignale des ersten Signals zu empfangen;

   die Speichermittel (6) Adressen haben, die zumindest ein Teilbild des digitalen Videosignals speichern können;

   die Steuermittel (9, 12, 13A, 13B, 15A, 15B) variabel eine Startadresse der Adressen der Speichermittel bestimmen, die durch die Lesemittel (7) gelesen werden; und

   die Steuermittel (9, 12, 13A, 13B, 15A, 15B) manuelle Steuermittel (13A, 13B; 15A, 15B) aufweisen, um die Startadresse manuell zu steuern.

2. Vorrichtung nach Anspruch 1, bei der das erste und zweite Bildseitenverhältnis jeweils das Verhältnis der horizontalen Abmessung zur vertikalen Abmessung der entsprechenden Bildanzeigeeinheit ist, und bei der das erste Bildseitenverhältnis größer ist als das zweite Bildseitenverhältnis ist, so daß die Startadresse einen Teil der Bildanzeigeeinheit des ersten Bildseitenverhältnisses bestimmt, das zumindest auf der einen Seite der Bildanzeigeeinheit des zweiten Bildseitenverhältnisses weggelassen wird.

3. Vorrichtung nach Anspruch 1 oder 2, welche weiter Zeilenzahlkonvertermittel aufweist, die zwischen den Speichermitteln (6) und den Digital-Analog-Konvertermitteln (8) verbunden sind, um die Zeilenanzahl in einem Teilbild der digitalen Videosignale, die aus den Speichermitteln (6) gelesen werden, von der ersten Anzahl in die zweite Anzahl zu konvertieren.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, bei der die manuellen Steuermittel eine Fernbedienung (15B) aufweisen.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, bei der die manuellen Steuermittel durch einen Steuerhebel (Joystick) 13A gebildet sind.

6. Vorrichtung nach Anspruch 1, bei der jedes des ersten und zweiten Bildseitenverhältnisses durch das Verhältnis der horizontalen Abmessung zur vertikalen Abmessung der entsprechenden Bildanzeigeeinheit gebildet ist, und wobei das erste Bildseitenverhältnis größer als das zweite Bildseitenverhältnis ist.

7. Vorrichtung nach Anspruch 6, wobei das erste Bildseitenverhältnis 16:9 oder 5:3 und das zweite Bildseitenverhältnis 4:3 ist.

8. Vorrichtung nach Anspruch 7, bei dem das erste Format 1125 horizontale Abtastzeilen in einem Bild und das zweite Format 525 horizontale Abtastzeilen in einem Bild hat.

9. Vorrichtung nach Anspruch 8, bei dem die Speichermittel durch einen Bildspeicher gebildet sind.

Revendications

1. Appareil permettant de convertir des signaux vidéo d'un premier format, lequel comporte un premier nombre de lignes de balayage hori-



zontal d'une trame et un affichage d'image présentant un premier rapport d'allongement, en signaux vidéo d'un second format, lequel comporte un second nombre de lignes de balayage horizontal d'une trame et un affichage d'image présentant un second rapport d'allongement, ledit appareil comportant :

un moyen (1) pour recevoir des signaux vidéo dudit premier format ;

un moyen de convertisseur analogique/numérique (2) pour convertir lesdits signaux vidéo dudit premier format en signaux vidéo numériques ;

un moyen de mémoire (6) permettant de stocker lesdits signaux vidéo numériques dudit premier format ;

un moyen (4) pour écrire lesdits signaux vidéo numériques dans ledit moyen de mémoire (6) ;

un moyen (7) pour lire dans ledit moyen de mémoire (6) moins d'échantillons desdits signaux vidéo numériques qu'il n'en a été écrit dans ledit moyen de mémoire ;

un moyen de convertisseur numérique/analogique (8) pour convertir les signaux vidéo numériques lus dans ledit moyen de mémoire (6) en signaux vidéo analogiques dudit second format ; et

un moyen de commande (9, 12, 13A, 13B, 15A, 15B) pour déterminer de façon variable une fenêtre temporelle pour effectuer une lecture dans ledit moyen de mémoire,

caractérisé en ce que lesdits signaux vidéo sont transmis dans ledit premier format depuis un émetteur jusqu'à un récepteur,

ledit appareil contenant ledit moyen de réception (1), ledit moyen de convertisseur analogique/numérique (2), ledit moyen de mémoire (6), ledit moyen d'écriture (4), ledit moyen de lecture (7), ledit moyen de convertisseur numérique/analogique (8) et ledit moyen de commande (9, 12, 13A, 13B, 15A, 15B) est placé globalement au niveau du côté de récepteur pour recevoir lesdits signaux vidéo transmis dudit premier signal ;

ledit moyen de mémoire (6) comportant des adresses permettant de stocker au moins une trame dudit signal vidéo numérique ;

ledit moyen de commande (9, 12, 13A, 13B, 15A, 15B) détermine de façon variable une adresse de début desdites adresses du moyen de mémoire (6) lues par ledit moyen de lecture (7) ; et

ledit moyen de commande (9, 12, 13A, 13B, 15A, 15B) inclut un moyen de commande manuelle (13A, 13B ; 15A, 15B) pour commander manuellement ladite adresse de début.

2. Appareil selon la revendication 1, dans lequel lesdits premier et second rapports d'allongement sont chacun le rapport de la dimension horizontale sur la dimension verticale de l'affichage d'image respectif et ledit premier rapport d'allongement est supérieur audit second rapport d'allongement de telle sorte que ladite adresse de début détermine une partie de l'affichage d'image dudit premier rapport d'allongement qui est omise au moins au niveau d'un côté dudit affichage d'image dudit second rapport d'allongement.

3. Appareil selon la revendication 1 ou 2, comprenant en outre un moyen de conversion de nombre de lignes connecté entre ledit moyen de mémoire (6) et ledit moyen de convertisseur numérique/analogique (8) pour convertir le nombre de lignes d'une trame desdits signaux vidéo numériques lue dans ledit moyen de mémoire (6) de la forme dudit premier nombre en la forme dudit second nombre.

4. Appareil selon l'une quelconque des revendications 1 à 3, dans lequel ledit moyen de commande manuelle inclut une commande à distance (15B).

5. Appareil selon l'une quelconque des revendications 1 à 4, dans lequel ledit moyen de commande manuelle se présente sous la forme d'une manette d'actionnement ou manche à balai (13A).

6. Appareil selon la revendication 1, dans lequel chacun desdits premier et second rapports d'allongement et le rapport de la dimension horizontale sur la dimension verticale de l'affichage d'image respectif et ledit premier rapport d'allongement est supérieur audit second rapport d'allongement.

7. Appareil selon la revendication 6, dans lequel ledit premier rapport d'allongement vaut 16:9 ou 5:3 et ledit second rapport d'allongement vaut 4:3.

8. Appareil selon la revendication 7, dans lequel ledit premier format comporte 1125 lignes de balayage horizontal d'une image et ledit second format comporte 525 lignes de balayage horizontal d'une image.

9. Appareil selon la revendication 8, dans lequel ledit moyen de mémoire est une mémoire d'image.