

Description

The present invention relates generally to apparatus for processing a color video signal and more particularly to such apparatus which minimizes sideband interference and line-to-line level differences from a single tube-type color video camera having complementary color filters of the so-called checkered type.

In a black and white (monochromatic) video camera utilizing a charge-coupled device (CCD), a video signal of frequency f_i is sampled at a sampling frequency f_s . However, this results in a sideband component (known as aliasing noise) at the frequencies $f_s \pm f_i$ as shown in the frequency spectrum representation of Fig. 1. In a color video camera, however, the requisite color filter has different spectral sensitivities for achromatic color so that sideband components (or aliasing noise) are produced at the frequencies $f_s/2 \pm f_i$ as shown in Fig. 2. Such $f_s/2 \pm f_i$ sideband components are produced when the color filter is of the type having rows of color filter elements formed of two filter pixel units which alternate repeatedly in the horizontal direction.

This sideband component produced when an achromatic color scene is imaged, produces zero beat noise with the input frequency f_i . Assuming a 510H imager (that is, an imager having 510 filter pixels per line) with a sampling frequency $f_s = 9.6\text{MHz}$, Fig. 3 represents that zero beat frequencies of 3.6MHz, 3.2MHz and 2.4MHz are produced at the higher harmonics of the input frequency f_i having fundamental frequencies 1.2MHz, 1.6MHz and 2.4MHz, respectively. This zero beat noise gives rise to distortion in the picture produced from the video camera.

In order to remove the side band component in the color video signal produced when achromatic color is imaged, color video signal processing has been proposed. While this apparatus operates satisfactorily for achromatic color signals, when that same apparatus is used with a chromatic color video signal, line-to-line level variations are induced in the luminance signal, resulting in interference in the picture displayed therefrom.

EP-A-0291354, which is only relevant under Article 54(3) EPC, concerns an image pick-up apparatus having a gamma correction circuit and vertical and horizontal contour compensation circuits. Pixel compensation circuits are provided for reducing modulation components caused by a colour filter during saturation in the image pick-up and low pass circuits combined with clippers are provided in the vertical compensation circuit to reduce modulation components caused by compensation in the pixel compensation circuits.

It is an object of the present invention to provide improved apparatus for processing a color video signal to eliminate, or at least substantially minimize,

sideband components in an achromatic color signal and line-to-line level variations in a chromatic color signal.

It is another object of the present invention to provide such apparatus that is particularly advantageous for use with a color video camera having a checkerboard-type color filter.

According to the present invention, there is provided apparatus for processing a colour video signal comprising:

imager means for generating a colour video signal representing an image picked up by said imager means;

low-pass filter means supplied with said colour video signal from said imager means and having frequency characteristics for generating a luminance signal therefrom;

level correcting means also supplied with said colour video signal from said imager means for producing a level-corrected luminance signal therefrom;

bandpass filter means supplied with said level corrected luminance signal and having frequency characteristics for extracting an outline component from the level-corrected luminance signal; and

adding means for adding said outline component from said bandpass filter means to said luminance signal generated by said low-pass filter means wherein the frequency characteristics of the low-pass filter and the band-pass filter are such that the addition reduces sideband components in an achromatic colour video signal and reduces line-to-line level variations in a chromatic colour video signal.

These and other objects, features and advantages of the present invention will be apparent from the following detailed description, given by way of example and not intended to limit this invention solely thereto, when read in conjunction with the accompanying drawings.

Fig. 1 is a representation of the frequency spectrum obtained from a black and white imager;

Fig. 2 is a representation of the frequency spectrum obtained from a color imager;

Fig. 3 represents how zero beat noise is produced due to sideband components;

Fig. 4 is a block diagram of previously proposed apparatus for processing a color video signal to eliminate sideband components from an imager achromatic color signal;

Fig. 5 is a schematic diagram of a complementary color filter that may be used with the apparatus of Fig. 4;

Figs. 6A to 6C are schematic waveform diagrams which are useful in explaining the operation of the apparatus of Fig. 4;

Figs. 7A to 7C are schematic waveform diagrams which are useful in explaining the operation of the apparatus of Fig. 4;

Fig. 8 is a block diagram of an embodiment of the

present invention;

Figs. 9A to 9C are schematic waveform diagrams which are useful in explaining the operation of the bandpass filter used in the present invention;

Figs. 10A to 10E are schematic waveform diagrams which are useful in explaining the operation of the apparatus of Fig. 8; and

Figs. 11A to 11E are schematic waveform diagrams which are useful in explaining the operation of the apparatus of Fig. 8.

Before describing the present invention, reference is made to Fig. 4. There is shown a CCD imager 1 which supplies an output signal S1 to a level balance circuit 2 comprises of a multiplier 3 and a switch 4 which selectively supplies one of several predetermined coefficients K1 to K4 to the multiplier. An imager signal S1 from CCD imager 1 is supplied to multiplier 3 which is adapted to multiply the level of the imager signal with the coefficient K1 to K4 selected by switch 4.

An output signal S2 from multiplier 3 is filtered by a low-pass filter 5 which produces a luminance signal S3. This luminance signal S3 is coupled directly to an adder 6, and also is supplied to the adder through a bandpass filter 7 which functions as an aperture circuit. The bandpass filter 7 extracts an outline component from the luminance signal S3, which is added in adder 6 to the luminance signal produced by low-pass filter 5. Consequently, adder 6 generates a luminance signal whose outline is emphasized.

A timing circuit 8 generates timing signals for the scanning of filter pixels P1, P2 of imager 1 (as will be described) and timing signals for the scanning of horizontal lines n and $n + 1$ of filter pixels (as will also be described). The filter pixels constitute a color filter for imager 1, used as part of a so-called complementary color checkered coding system shown in Fig. 5. The timing signals of timing circuit 8 are supplied to a control circuit 9 which, in turn, supplies switching signals to switch 4 to select a respective multiplier coefficient K1 to K4.

The color filter used with CCD imager 1 carries out complementary color checkered coding and, as one example, may be of the type shown in Fig. 5. This color filter is comprised of a fundamental arrangement formed of two columns and four rows of pixel filter units. For example, the first and third rows are formed of repetitive, alternate cyan (Cy) and yellow (Ye) elements, or pixel units, and the second and fourth rows are formed of repetitive alternate magenta (Mg) and green (G) elements. The sum of the cyan and magenta elements constitutes a first pixel P1 of the n -th line of filter elements, and the sum of the yellow and green elements constitutes a second pixel P2 of the n -th line. The n -th line is formed by the repetition of alternate pixels P1 and P2.

The sum of the cyan and green elements constitutes a first pixel P1 of the $(n + 1)$ -th line of filter ele-

ments, and the sum of the yellow and magenta elements constitutes a second pixel P2 of the $(n + 1)$ -th line. The $(n + 1)$ -th line is formed by the repetition of alternate pixels. Japanese Laid-Open Patent Gazette No. 62-277879 describes other examples of complementary color checkered coding.

When timing circuit 8 generates a timing signal for the first pixel P1 of the n -th line, control circuit 9 supplies a corresponding switching signal to switch 4 to supply the coefficient K1 to multiplier 3 for multiplying the imager signal therewith. When the timing circuit generates a timing signal for the second pixel P2 of the n -th line, the control circuit supplies a switching signal to switch 4 to supply the coefficient K2 to the multiplier. Similarly, when the timing circuit generates a timing signal for the first pixel P1 of the $(n + 1)$ -th line, the imager signal is multiplied by the coefficient K3; and when the timing circuit generates a timing signal for the second pixel P2 of the $(n + 1)$ -th line, the imager signal is multiplied by the coefficient K4.

The operation of the color video signal processing apparatus on an achromatic color scene will be explained with reference to Fig. 6. When an achromatic color scene is scanned, CCD imager 1 generates an output imager signal S1 having two different levels corresponding to the first and second pixels P1 and P2 of the n -th line and an additional two different levels corresponding to the first and second pixels P1 and P2 of the $(n + 1)$ -th line, as shown in Fig. 6A. Multiplier 3 of level balance circuit 2 multiplies the signal S1 with respective ones of coefficients K1 to K4 to generate signal S2 in which the above-noted imager signal levels are adjusted to be substantially the same throughout lines n and $(n + 1)$, as shown in Fig. 6B. In this level-corrected state, the sideband components shown in Fig. 2 are not present. The luminance signal derived from an achromatic color signal can be level-balanced with no difficulties, resulting in the output signal S3 from low-pass filter 5, as shown in Fig. 6C.

Since the coefficients K1 to K4 of level balance circuit 2 are determined so as to level balance an achromatic color signal, when the imager signal S1 from CCD imager 1 is a chromatic color signal and is multiplied by the coefficients K1 to K4, a level difference occurs from one line to the next in the luminance signal, producing a horizontal stripe effect in the picture reproduced therefrom, as now will be explained with reference to Figs. 7A to 7C. When a chromatic color scene is scanned, CCD imager 1 generates the output signal (imager signal) S1' shown in Fig. 7A, having two different levels corresponding to the first and second pixels P1, P2 of the n -th line and an additional two different levels corresponding to the pixels P1, P2 of the $(n + 1)$ -th line. Multiplier 3 of level balance circuit 2 multiplies the signal S1' with respective ones of coefficients K1 to K4 which, it is recognized, are the same as used to multiply the achromatic color signal. The multiplier generates output signal S2' in

which the levels of the pixels are different within a given line and from line to line, as shown in Fig. 7B.

When signal S2' is filtered by low-pass filter 5, an output signal S3' is generated in which the pixel-to-pixel levels are averaged to a common level within a line, but the averaged pixel levels in one line differ from the averaged pixel levels in the next line, as shown in Fig. 7C. This results in horizontal stripes in the video picture.

Turning now to Fig. 8, one embodiment of the present invention will be described. Those parts in Fig. 8 which are the same as those of Fig. 4 are identified with the same reference numerals. As shown, the imager signal from CCD imager 1 is supplied to adder 6 by way of level correcting circuit 2 and bandpass filter 7, as in Fig. 4, and also through a low-pass filter 10. It is seen that the imager signal which passes through low-pass filter 10 is not level-processed, but is added to the level-balanced aperture signal from bandpass filter 7. This prevents line-to-line level differences from being produced when a chromatic color signal is produced by the imager. As was true for the Fig. 4 apparatus, the Fig. 8 embodiment eliminates the aforementioned undesired sideband component when an achromatic color signal is produced.

Bandpass filter 7 has the frequency characteristic shown in Fig. 9A, wherein its pass band center frequency is, for example, $f_s/2$ (4.8MHz in the case of a 510H imager). Thus, the bandpass filter does not pass a low frequency component such as on the order of about half the usual horizontal synchronizing frequency. When supplied with a signal derived from several pixel units and having a high band component of the type represented by the waveform shown in Fig. 9B, bandpass filter 7 extracts an outline component having the waveform shown in Fig. 9C.

The operation of the circuit arrangement shown in Fig. 8 now will be explained with reference to the schematic waveform diagrams of Figs. 10 and 11. First, let it be assumed that the Fig. 8 apparatus is used to image an achromatic color scene. CCD imager 1 generates the achromatic color video signal (imager signal) S1 having the two levels produced by the first and second pixels P1 and P2 of the n-th line and the two different levels produced by first and second pixels P1 and P2 of the (n + 1)-th line, as shown in Fig. 10A. When the signal S1 is multiplied by respective ones of the coefficients K1 to K4 in multiplier 3 of level balance circuit 2, the multiplier generates output signal S2 in which the above-noted imager signal levels are adjusted to be substantially the same in both line n and line (n + 1), as shown in Fig. 10B. In this level-corrected state, the sideband components shown in Fig. 2 are not produced.

The level-corrected signal S2 is filtered by low-pass filter 5 which generates output signal S3 that is seen to be similar to signal S2. Signal, S3, having low frequency components, is supplied to bandpass filter

7 which generates an output signal S4 of substantially zero level, as shown in Fig. 10D. It will be appreciated that the low frequency components of signal S3 are below the cut-off frequency of bandpass filter 7. The signal S4 is supplied as one input to adder 6.

Imager signal S1 from the CCD imager also is supplied to low-pass filter 10. The spectral sensitivities of the color filters used with the CCD imager and the filter characteristics of low-pass filter 10 are such that the low-pass filter generates an output having substantially no line-to-line level differences, both for achromatic color imaging and chromatic color imaging. Therefore, low-pass filter 10 generates an output signal S5 as shown in Fig. 10E. The signal S5 is supplied as another input to adder 6 which produces an output luminance signal for achromatic color whose sideband components are removed.

Let it now be assumed that the Fig. 8 apparatus is used to image a chromatic color scene. CCD imager 1 now generates the chromatic color video signal (imager signal) S1' having the two levels produced by the first and second pixels P1, P2 of the n-th line and the two different levels produced by the first and second pixels P1, P2 of the (n + 1)-th line, as shown in Fig. 11A. The signal S1' is multiplied by respective ones of the coefficients K1 to K4 (which are the same coefficients as used when an achromatic color signal is produced in multiplier 3 of level balance circuit 2). The multiplier generates output signal S2' in which the P1 and P2 levels in line n differ from each other and from the P1 and P2 levels in line (n + 1), as shown in Fig. 11B.

As was the case in the Fig. 4 embodiment, low-pass filter 5 filters signal S2' to produce output signal S3' in which the pixel-to-pixel levels are averaged to a common level within a line but the averaged pixel levels in one line differ from the averaged pixel levels in the next line, as shown in Fig. 11C. The frequency components of low-pass filtered signal S3' are too low to pass through bandpass filter 7 and, hence, the line-to-line level differences are removed by the bandpass filter. More particularly, the signal S3' has a frequency of about half the horizontal synchronizing signal, which is below the bandpass filter cut-off frequency. Thus, bandpass filter 7 produces an output signal S4' of substantially zero level, as shown in Fig. 11D, and this signal S4' is supplied to one input of adder 6.

Output signal S1' from CCD imager 1 also is supplied to low-pass filter 10. Since the bandwidth of low-pass filter 10 prevents the pixel-to-pixel level differences within a line and from one line to the next from being passed, both for achromatic color and for chromatic color signals, as described above, the low-pass filter generates the output signal S5' shown in Fig. 11E. This filtered signal S5' is supplied to the other input of adder 6 wherein it is summed with signal S4' to produce a luminance signal in which line-to-line level

differences that would otherwise be produced for chromatic color are removed.

In accordance with the present invention, the imager, or main line, signal is not processed and the aperture signal is level-balanced, resulting in a luminance signal in which line-to-line level differences are removed when the imager signal is a chromatic color signal and in which undesired noise sideband components are removed when the imager signal is an achromatic color signal.

The imager signal is derived from a complementary color filter and filtered by a low-pass filter to provide a luminance signal to which is added an outline component produced by multiplying the imager signal with predetermined pixel-by-pixel level-correcting coefficients and filtering the multiplied signal with a bandpass filter which suppresses low frequency components. The outline component extracted by the bandpass filter and added to the luminance signal results in a luminance signal whose outline is emphasized.

Claims

1. Apparatus for processing a colour video signal comprising:

imager means (1) for generating a colour video signal representing an image picked up by said imager means (1);

low-pass filter means (10) supplied with said colour video signal from said imager means (1) and having frequency characteristics for generating a luminance signal therefrom;

level correcting means (2) also supplied with said colour video signal from said imager means (1) for producing a level-corrected luminance signal therefrom;

bandpass filter means (7) supplied with said level corrected luminance signal and having frequency characteristics for extracting an outline component from the level-corrected luminance signal; and

adding means (6) for adding said outline component from said bandpass filter means (7) to said luminance signal generated by said low-pass filter means (10) wherein the frequency characteristics of the low-pass filter (10) and the band-pass filter (7) are such that the addition reduces sideband components in an achromatic colour video signal and reduces line-to-line level variations in a chromatic colour video signal.

2. The apparatus of claim 1, wherein said imager means (1) includes a colour filter.
3. The apparatus of claim 2, wherein said colour filter is a complementary colour filter.

4. The apparatus of claim 3, wherein said complementary colour filter comprises a checkerboard array of colour filter elements.

5. The apparatus of claim 4, wherein said checkerboard array of colour filter elements comprises alternating first and second lines of filter elements, said first line including alternating first and second pixel units and said second line including alternating third and fourth pixel units.

6. The apparatus of claim 5, wherein said first pixel unit is comprised of cyan and magenta elements, said second pixel unit is comprised of yellow and green elements, said third pixel unit is comprised of cyan and green elements, and said fourth pixel unit is comprised of yellow and magenta elements.

7. The apparatus of any one of the preceding claims, wherein said level correcting means (2) includes a level balance circuit (3, 4) coupled to said imager means (1) and a low-pass filter (5) coupled to said level balance circuit (3, 4).

8. The apparatus of claim 7, wherein said level balance circuit (3, 4) is comprised of a multiplier (3) for receiving said colour video signal and a switch (4) for supplying multiplying coefficients to said multiplier (3).

9. The apparatus of claim 8 wherein said imager means (1) includes rows of colour filter elements, each row containing a repetitive pattern of filter pixels; said apparatus further comprising a timing circuit (8) for generating timing signals to establish filter pixel and row scanning times, and a control circuit (9) supplied with said timing signals for controlling said switch (4) to supply a respective multiplying coefficient to said multiplier (3) as a function of the row and filter pixel scanning times.

10. The apparatus of any one of the preceding claims wherein said imager means (1) is a charge coupled device (CCD).

Patentansprüche

1. Vorrichtung zur Bearbeitung eines Farbvideosignals, umfassend:
eine Bildumsetzeinrichtung (1) zur Erzeugung eines Farbvideosignals, welches ein durch die Bildumsetzeinrichtung (1) aufgenommenes Bild repräsentiert;
eine Tiefpaßfiltereinrichtung (10), welcher das Farbvideosignal von der Bildumsetzeinrichtung



differences that would otherwise be produced for chromatic color are removed.

In accordance with the present invention, the imager, or main line, signal is not processed and the aperture signal is level-balanced, resulting in a luminance signal in which line-to-line level differences are removed when the imager signal is a chromatic color signal and in which undesired noise sideband components are removed when the imager signal is an achromatic color signal.

The imager signal is derived from a complementary color filter and filtered by a low-pass filter to provide a luminance signal to which is added an outline component produced by multiplying the imager signal with predetermined pixel-by-pixel level-correcting coefficients and filtering the multiplied signal with a bandpass filter which suppresses low frequency components. The outline component extracted by the bandpass filter and added to the luminance signal results in a luminance signal whose outline is emphasized.

Claims

1. Apparatus for processing a colour video signal comprising:
 - imager means (1) for generating a colour video signal representing an image picked up by said imager means (1);
 - low-pass filter means (10) supplied with said colour video signal from said imager means (1) and having frequency characteristics for generating a luminance signal therefrom;
 - level correcting means (2) also supplied with said colour video signal from said imager means (1) for producing a level-corrected luminance signal therefrom;
 - bandpass filter means (7) supplied with said level corrected luminance signal and having frequency characteristics for extracting an outline component from the level-corrected luminance signal; and
 - adding means (6) for adding said outline component from said bandpass filter means (7) to said luminance signal generated by said low-pass filter means (10) wherein the frequency characteristics of the low-pass filter (10) and the band-pass filter (7) are such that the addition reduces sideband components in an achromatic colour video signal and reduces line-to-line level variations in a chromatic colour video signal.
2. The apparatus of claim 1, wherein said imager means (1) includes a colour filter.
3. The apparatus of claim 2, wherein said colour filter is a complementary colour filter.
4. The apparatus of claim 3, wherein said complementary colour filter comprises a checkerboard array of colour filter elements.
5. The apparatus of claim 4, wherein said checkerboard array of colour filter elements comprises alternating first and second lines of filter elements, said first line including alternating first and second pixel units and said second line including alternating third and fourth pixel units.
6. The apparatus of claim 5, wherein said first pixel unit is comprised of cyan and magenta elements, said second pixel unit is comprised of yellow and green elements, said third pixel unit is comprised of cyan and green elements, and said fourth pixel unit is comprised of yellow and magenta elements.
7. The apparatus of any one of the preceding claims, wherein said level correcting means (2) includes a level balance circuit (3, 4) coupled to said imager means (1) and a low-pass filter (5) coupled to said level balance circuit (3, 4).
8. The apparatus of claim 7, wherein said level balance circuit (3, 4) is comprised of a multiplier (3) for receiving said colour video signal and a switch (4) for supplying multiplying coefficients to said multiplier (3).
9. The apparatus of claim 8 wherein said imager means (1) includes rows of colour filter elements, each row containing a repetitive pattern of filter pixels; said apparatus further comprising a timing circuit (8) for generating timing signals to establish filter pixel and row scanning times, and a control circuit (9) supplied with said timing signals for controlling said switch (4) to supply a respective multiplying coefficient to said multiplier (3) as a function of the row and filter pixel scanning times.
10. The apparatus of any one of the preceding claims wherein said imager means (1) is a charge coupled device (CCD).

Patentansprüche

1. Vorrichtung zur Bearbeitung eines Farbvideosignals, umfassend:
 - eine Bildumsetzeinrichtung (1) zur Erzeugung eines Farbvideosignals, welches ein durch die Bildumsetzeinrichtung (1) aufgenommenes Bild repräsentiert;
 - eine Tiefpaßfiltereinrichtung (10), welcher das Farbvideosignal von der Bildumsetzeinrichtung



- (1) zugeführt wird, und welche Frequenzcharakteristiken zur Erzeugung eines Luminanzsignals daraus aufweist;
 eine Pegelkorrektureinrichtung (2), welcher ebenfalls das Farbvideosignal von der Bildumsetzeinrichtung (1) zur Erzeugung eines Luminanzsignals mit korrigiertem Pegel daraus zugeführt wird;
 eine Bandpaßfiltereinrichtung (7), welcher das Luminanzsignal mit korrigiertem Pegel zugeführt wird, und welche Frequenzcharakteristiken zur Ausblendung einer Umrißkomponente aus dem Luminanzsignal mit korrigiertem Pegel aufweist; und
 eine Additionseinrichtung (6) zur Addition der Umrißkomponente von der Bandpaßfiltereinrichtung (7) zu dem durch die Tiefpaßfiltereinrichtung (10) erzeugten Luminanzsignal, wobei die Frequenzcharakteristiken des Tiefpaßfilters (10) und des Bandpaßfilters (7) derart sind, daß die Addition die Seitenbandkomponenten in einem achromatischen Farbvideosignal reduziert und die Pegelabweichungen zwischen den Zeilen in einem chromatischen Farbvideosignal reduziert.
2. Vorrichtung nach Anspruch 1, bei welcher die Bildumsetzeinrichtung (1) ein Farbfilter enthält.
 3. Vorrichtung nach Anspruch 2, bei welcher das Farbfilter ein Komplementärfarbfilter ist.
 4. Vorrichtung nach Anspruch 3, bei welcher das Komplementärfarbfilter eine Mosaikspeicheranordnung (Checkerboard array) aus Farbfilterelementen umfaßt.
 5. Vorrichtung nach Anspruch 4, bei welcher die Mosaikspeicheranordnung aus Farbfilterelementen abwechselnd erste und zweite Zeilen von Filterelementen umfaßt, wobei die erste Zeile abwechselnd erste und zweite Pixeleinheiten enthält und die zweite Zeile abwechselnd dritte und vierte Pixeleinheiten enthält.
 6. Vorrichtung nach Anspruch 5, bei welcher die erste Pixeleinheit Cyan- und Magenta-Elemente enthält, die zweite Pixeleinheit Gelb- und Grün-Elemente enthält, die dritte Pixeleinheit Cyan- und Grün-Elemente und die vierte Pixeleinheit Gelb- und Magenta-Elemente enthält.
 7. Vorrichtung nach einem der vorhergehenden Ansprüche, bei welcher die Pegelkorrektureinrichtung (2) eine Pegelbalanceschaltung (3, 4), welche mit der Bildumsetzschialtung (1) verbunden ist, und ein Tiefpaßfilter (5), welches mit der Pegelbalanceschaltung (3, 4) verbunden ist, enthält.
 8. Vorrichtung nach Anspruch 7, bei welcher die Pegelbalanceschaltung (3, 4) aus einem Multiplizierer (3) zum Empfang des Farbvideosignals und einem Schalter (4) für die Zuführung von Multiplikationskoeffizienten zu dem Multiplizierer (3) besteht.
 9. Vorrichtung nach Anspruch 8, bei welcher die Bildumsetzeinrichtung Reihen von Farbfilterelementen enthält, wobei jede Reihe ein sich wiederholendes Muster von Filterpixel enthält; wobei die Vorrichtung weiterhin eine Zeitsteuerungsschaltung (8) zur Erzeugung von Synchronisierungssignalen, um Filterpixel- und Reihenabtastzeiten festzusetzen, und eine Steuerschaltung (9), welcher die Synchronisierungssignale zur Steuerung des Schalters (4), um dem Multiplizierer (3) einen jeweiligen Multiplikationskoeffizienten als Funktion der Reihen- und Filterpixelabtastzeiten zuzuführen, zugeführt werden, umfaßt.
 10. Vorrichtung nach einem der vorhergehenden Ansprüche, bei welcher die Bildumsetzeinrichtung (1) eine ladungsgekoppelte Einrichtung (charge coupled device - CCD) ist.

Revendications

1. Dispositif pour traiter un signal vidéo couleur, comprenant :
 un moyen imageur (1) pour produire un signal vidéo couleur représentant une image analysée par ledit moyen imageur (1) ;
 un moyen formant filtre passe-bas (10) alimenté avec ledit signal vidéo couleur provenant dudit moyen imageur (1) et ayant une réponse en fréquence propre à produire un signal de luminance ;
 un moyen de correction de niveau (2), également alimenté avec ledit signal vidéo couleur provenant dudit moyen imageur (1), pour produire un signal de luminance corrigé en niveau ;
 un moyen formant filtre passe-bande (7), alimenté avec ledit signal de luminance corrigé en niveau, et ayant une réponse en fréquence propre à extraire une composante de contour du signal de luminance corrigé en niveau ; et
 un moyen d'addition (6) pour additionner ladite composante de contour issue dudit moyen formant filtre passe-bande (7) audit signal de luminance produit par ledit moyen formant filtre passe-bas (10), dans lequel les réponses en fréquence du filtre passe-bas (10) et du filtre passe-bande (7) sont telles que l'addition réduit les composantes de bandes latérales dans un signal



vidéo couleur achromatique et réduit les variations de niveau d'une ligne à l'autre dans un signal vidéo couleur chromatique.

cadencements de balayage de lignes et de pixels filtres.

2. Dispositif selon la revendication 1, dans lequel ledit moyen imageur (1) comprend un filtre coloré. 5
3. Dispositif selon la revendication 2, dans lequel ledit filtre coloré est un filtre de couleurs complémentaires. 10
4. Dispositif selon la revendication 3, dans lequel ledit filtre coloré comprend une matrice en damier d'éléments filtres colorés. 15
5. Dispositif selon la revendication 4, dans lequel ladite matrice en damier d'éléments filtres colorés comprend des première et seconde lignes d'éléments filtres, alternées, ladite première ligne incluant des premier et deuxième blocs de pixels alternés et ladite seconde ligne incluant des troisième et quatrième blocs de pixels alternés. 20
6. Dispositif selon la revendication 5, dans lequel ledit premier bloc de pixels est constitué d'éléments cyan et magenta, ledit deuxième bloc de pixels est composé d'éléments jaune et vert, ledit troisième bloc de pixels est composé d'éléments cyan et vert, et ledit quatrième bloc de pixels est composé d'éléments jaune et magenta. 25 30
7. Dispositif selon l'une quelconque des revendications précédentes, dans lequel ledit moyen de correction de niveau (2) comprend un circuit d'équilibrage de niveau (3, 4) connecté audit moyen imageur (1) et un filtre passe-bas (5) connecté audit circuit d'équilibrage de niveau (3, 4). 35
8. Dispositif selon la revendication 7, dans lequel ledit circuit d'équilibrage de niveau (3, 4) est composé d'un multiplieur (3) pour recevoir ledit signal vidéo couleur et d'un commutateur (4) pour délivrer des coefficients multiplicateurs audit multiplieur (3). 40 45
9. Dispositif selon la revendication 8, dans lequel ledit moyen imageur (1) comprend des lignes d'éléments filtres colorés, chaque ligne comprenant une combinaison répétitive de pixels filtres; ledit dispositif comprenant en outre un circuit de cadencement (8) pour produire des signaux de cadencement pour établir des cadencements de balayage de pixels filtres et de lignes, et un circuit de commande (9) alimenté avec lesdits signaux de cadencement pour commander ledit commutateur (4) pour fournir un coefficient multiplicateur respectif audit multiplieur (3) en fonction des 50 55

10. Dispositif selon l'une quelconque des revendications précédentes, dans lequel ledit moyen imageur (1) est un dispositif à couplage de charge (CCD).