

Description

The present invention relates to an image transition detector for use in a video signal processor including a comb filter.

Video signal processors use comb filters to separate luminance and chrominance components from composite video signals. Comb filters compare adjacent lines to perform the separation. In the illustrative case of a line delay comb filter, the lines compared are one horizontal line period apart.

In the absence of any transition in the image information, the brightness representative information is the same in both compared lines. Also, in the absence of any such transition, the amplitude of the color subcarrier carrying the color representative information will remain the same and the phase will change by 180° between the compared lines. Consequently, if the two lines are added, the color subcarrier will be canceled, leaving only the luminance component. If the two lines are subtracted, the luminance component will be canceled leaving only the color subcarrier containing the chrominance component.

If, however, there is a transition in the image information between the compared lines, then the separation will be imperfect. If, for example, a chrominance transition occurs, some color representative information will be present in the comb filtered luminance signal. If on the other hand a luminance transition occurs, some brightness representative information will be present in the comb filtered chrominance signal (beyond the vertical detail information which normally appears there.) It is desirable to detect image transitions and to correct the comb filtered component signals, eliminating the information from the other comb filtered component signals.

Some prior art comb filter circuits detect imperfect separation by calculating the cross-correlation between the comb filtered luminance and chrominance signals. If the cross-correlation exceeds a given threshold, then it is assumed that some color representative information is in the comb filtered luminance signal. In such a case, the frequency composition of the comb filtered luminance signal is altered to eliminate the color representative information. The usual alteration is to switch a filter circuit into the signal path to filter out the relatively high frequency portion of the comb filtered luminance signal, the portion normally occupied by the color representative information. This frequency altered comb filtered luminance signal is coupled to the luminance processing channel. U.S. Patent US-A-4,241,363 entitled "Comb Filter Circuit" issued December 23, 1980 to Maeyama et al. is an example of such a comb filter circuit.

The basis of the present invention, is the recognition that at a chrominance transition, the comb

filtered luminance signal has a color subcarrier signal component in it. The color subcarrier is completely canceled from the comb filtered luminance signal otherwise. Thus, a chrominance transition is characterized by a line of comb filtered luminance signal having a color subcarrier component between two lines with no such component. At a luminance transition involving high horizontal detail (such that the frequency of the brightness representative information is in the band of frequencies normally occupied by the color representative information) the comb filtered chrominance signal has some of the brightness representative information in it. Thus, in a similar manner, the luminance transition is characterized by a line of comb filtered chrominance signal with a brightness representative component between two lines with no such component.

In accordance with the principles of the present invention, as set out in claim 1 an image transition detector compares one of the comb filtered component signals from adjacent line intervals. A signal detector detects signals in the band of frequencies normally occupied by color representative information for a given line and two lines adjacent to the given line. A control signal generator generates a control signal in response to the relative levels of the detected color representative signals for the given line, and the adjacent lines. The composition of the comb filtered component signal coupled from the comb filter to the component processing channel is altered in response to the generated control signal.

In the drawings:

FIGURE 1 is a block diagram of a video signal processor embodying an image transition detector according to the present invention;

FIGURE 2 is a block diagram of a signal detector which may be used in the image transition detector of FIGURE 1;

FIGURE 3 is a diagram partially in block form and partially in logic schematic form of a control signal generator which may be used in the image transition detector of FIGURE 1; and

FIGURE 4 is a block diagram of an alternative control signal generator which may be used in the image transition detector of FIGURE 1.

In FIGURE 1, a composite video signal from, for example, the front end of a standard color television receiver (not shown), is applied to a terminal 5. The signal at terminal 5 is supplied to a line delay comb filter 10. Comb filter 10 comprises, for example, a one horizontal line delay circuit and an adder coupled to the input and output of the delay circuit, for producing at the sum output the comb filtered luminance signal Y. The comb filtered luminance signal Y is applied to a signal

detector 20 and a signal coupler 40. Signal coupler 40 couples the comb filtered luminance signal Y from the comb filter 10 to a luminance processing channel 50. The outputs of signal detector 20, representing top, middle and bottom adjacent lines, are coupled to control signal generator 30, and the output of control signal generator 30 is coupled to signal coupler 40. It will be understood that signal coupler 40 has incorporated within it matching delay circuits to align in time the comb filtered luminance signal with the control signal from control signal generator 30. The signal coupler 40 alters the composition of the comb filtered luminance signal in a manner exemplified by the above-mentioned U.S. Patent 4,241,363 (Maeyama) in response to a control signal.

Assume that an image represented by the video signal contains an upper region of one color and a lower region of a different color. The color subcarrier in the upper region will have an amplitude and phase angle (with respect to a given axis) representing the color of the upper region. The amplitude and phase angle of the subcarrier in the lower region will be different from those in the upper region, representing the different color.

The subcarrier phase angle for two adjacent lines both of which are in the upper region will differ by 180° . When these two lines are summed in the comb filter, the color subcarrier will be completely canceled. The same is true for two adjacent lines both of which are in the lower region. At the transition between the top and bottom regions, a line from the top region is summed with the adjacent line from the bottom region in the comb filter. The amplitudes of the subcarrier of the transitional lines will in general be different. In addition, the phase angles of the subcarrier with respect to the given axis of the transitional lines different, thus, the difference in phase angles between the two lines will not be 180° . Consequently, the subcarrier will not be completely canceled when the two lines are summed, and some signal in the vicinity of the color subcarrier frequency containing color representative information will remain in the comb filtered luminance signal at the transition.

Detector 20 generates signals which represent the levels of signals in the band of frequencies in the vicinity of the color subcarrier frequency for three adjacent lines. If the middle line contains such signals but the two adjacent lines do not, the control signal generator 30 generates the control signal.

FIGURE 2 illustrates a signal detector 20 which may be used in the image transition detector illustrated in FIGURE 1. The comb filtered luminance signal Y from comb filter 10 is supplied to bandpass filter 22. Bandpass filter 22 passes frequen-

cies in the vicinity of the color subcarrier, i.e. those frequencies which normally contain color representative information. The output of bandpass filter 22 is coupled to an input of an envelope detector 24 which includes a threshold detector. The output of envelope detector 24 is coupled to a delay line consisting of the cascade connection of delay circuits 26 and 28.

The output of bandpass filter 22 will resemble a sinusoid at the approximate frequency of the color subcarrier. Envelope detector 24 digitizes the output of bandpass filter 22. Whenever the amplitude of the sinusoidal signal from bandpass filter 22 exceeds the threshold level, envelope detector 24 outputs a '1', otherwise is outputs a '0'. The output of envelope detector 24 is a digitized signal representing the level of color representative information of the signal applied to filter 22. Delay circuits 26 and 28 each delay signals applied to their respective inputs by one horizontal line period. The output of delay circuit 28 and the output of delay circuit 26 are designated the top and middle lines respectively, and the output of envelope detector 24 is designated the bottom line of three successive adjacent image lines.

FIGURE 3 illustrates a control signal generator which may be used in conjunction with the signal detector 20 illustrated in FIGURE 2. The signals representing the level of the color representative information for the top and bottom lines from signal detector 20 are coupled to inverters 32 and 34 respectively. The signal representing information for the middle line from signal detector 20 is coupled to one input of AND gate 36. The outputs of inverters 32 and 34 are coupled to other respective inputs of AND gate 36. The output of AND gate 36 is coupled to an event correlator 38. The output of event correlator 38 is coupled to signal couple 40 of FIGURE 1.

If there is no color representative information in the top and bottom lines, then the inputs to inverters 32 and 34 are '0'. The outputs of inverters 32 and 34 are '1' only if their inputs are '0', meaning that the level of color representative information for the top and bottom lines are both below the predetermined threshold. The output of AND gate 36 will be a sequence of '1's only when the middle line has color representative information and the top and bottom lines have no color representative information.

The color representative information represented by the color subcarrier has a limited bandwidth compared to that of the luminance information. (For example, in the NTSC system, the I bandwidth is 1.5 MHz and the Q bandwidth is 0.5 MHz while the Y bandwidth is 4.2 MHz.) The sequence of '1's at the output of from AND gate 36 must last for an amount of time sufficient to properly represent

events of such limited bandwidth. Thus, event correlator 38 is required. Event correlator 38 looks for a predetermined number of '1's from AND gate 36. This known pattern is detected by event correlator 38 as a valid indication of a chrominance transition. If this number of successive '1's is detected, event correlator 38 generates the control signal supplied to signal coupler 40. An exemplary event correlator is described in U.S. Patent 4,061,976 entitled "Receivers for Pulses of Different Widths" issued December 6, 1977 to Sugai; see in particular the apparatus illustrated in FIGURE 18 and described in the corresponding text.

A continuously variable control signal may also be generated. One extreme condition indicating a chrominance transition occurs when the color representative information in the comb filtered luminance signal representing the middle line is at its maximum, and that for the adjacent lines is zero. In this case, signal coupler 40 should supply a fully filtered comb filtered luminance signal to the luminance signal processor 50.

The other extreme condition indicating no chrominance transition occurs when the same information in the vicinity of the color subcarrier is in all of the three compared lines. In this case, signal coupler 40 should supply a full bandwidth comb filtered luminance signal to luminance signal processor 50. In between these two extreme conditions, the comb filtered luminance signal coupled to the luminance processing channel by signal coupler 40 can be somewhere between the fully filtered and unfiltered signals supplied in the extreme conditions discussed above.

Signal coupler 40 may be constructed to respond to a control signal which is continuously variable between two extreme levels. In response to one extreme level of control signal, a fully filtered comb filtered luminance signal is coupled to luminance processing channel 50. In response to the other extreme level of control signal a full bandwidth comb filtered luminance signal is coupled to luminance processing channel 50. In response to levels of control signal between these two extremes, a combination of fully filtered and full bandwidth comb filtered luminance signal, with the proportion of each determined by the level of the control signal, is supplied to luminance processing channel 50. An example of such a signal coupler is described in U.S. Patent 4,149,181 entitled "Signal-Dependent Chrominance Subcarrier Filtering Circuit" issued April 10, 1979 to Burdick et al.; see particularly FIGURE 1, elements 40 through 46 and the associated text in column 3, lines 4 through 15.

FIGURE 4 illustrates a control signal generator 30 which generates a continuously variable control signal. The signal representing the top of three

adjacent lines is coupled to one input of subtractor 42; the signal representing the bottom of three adjacent lines is coupled to one input of subtractor 44; and the signal representing the middle of three adjacent lines is coupled to the other inputs of both subtractor 42 and 44 respectively. The outputs of subtractors 42 and 44 are coupled to envelope detectors 46 and 48 respectively (which do not include threshold detectors). The outputs of envelope detectors 46 and 48 are coupled to respective inputs of a minimizing non-additive mixer 50. The minimizing non-additive mixer functions to pass the signal applied to its input terminals which has the lesser magnitude. The output of minimizing non-additive mixer 50 is coupled to a function circuit 52 which produces at its output, a signal which is a function (possibly a non-linear function) of the signal at its input.

If the top, middle and bottom lines all have the same magnitude of color representative information, the outputs of both subtractors 42 and 44 and consequently both envelope detectors 46 and 48 are zero. The minimizing non-additive mixer also passes zero. This value is the value indicating no color representative information and causes the signal coupler unit to pass the full bandwidth color difference signal.

If the middle line has a high magnitude of color representative information relative to the top or bottom lines, then the outputs of the envelope detectors 46 and 48 are greater than zero. The lesser is passed through the function circuit 52 to cause some combination of non-filtered and filtered comb filtered luminance signal to be supplied to the luminance processing channel.

The image transition detector above has been described in an embodiment for detecting chrominance transitions and for correcting the comb filtered luminance component signal. It will be understood that such an image detector may also be used to detect high horizontal detail luminance transitions, and to correct the comb filtered chrominance component signal. In such a system, the comb filtered chrominance signal from the previous line is substituted for the contaminated one.

The above embodiments may be implemented in either continuous or sampled data form. Any sampled data embodiment may be implemented in either analog or digital form.

Claims

1. A video signal processor, including a comb filter (10) for producing a comb filtered component signal (Y or C), a component processing channel (50), and means (40) for coupling said comb filtered component signal to said component processing channel, said coupling means



events of such limited bandwidth. Thus, event correlator 38 is required. Event correlator 38 looks for a predetermined number of '1's from AND gate 36. This known pattern is detected by event correlator 38 as a valid indication of a chrominance transition. If this number of successive '1's is detected, event correlator 38 generates the control signal supplied to signal coupler 40. An exemplary event correlator is described in U.S. Patent 4,061,976 entitled "Receivers for Pulses of Different Widths" issued December 6, 1977 to Sugai; see in particular the apparatus illustrated in FIGURE 18 and described in the corresponding text.

A continuously variable control signal may also be generated. One extreme condition indicating a chrominance transition occurs when the color representative information in the comb filtered luminance signal representing the middle line is at its maximum, and that for the adjacent lines is zero. In this case, signal coupler 40 should supply a fully filtered comb filtered luminance signal to the luminance signal processor 50.

The other extreme condition indicating no chrominance transition occurs when the same information in the vicinity of the color subcarrier is in all of the three compared lines. In this case, signal coupler 40 should supply a full bandwidth comb filtered luminance signal to luminance signal processor 50. In between these two extreme conditions, the comb filtered luminance signal coupled to the luminance processing channel by signal coupler 40 can be somewhere between the fully filtered and unfiltered signals supplied in the extreme conditions discussed above.

Signal coupler 40 may be constructed to respond to a control signal which is continuously variable between two extreme levels. In response to one extreme level of control signal, a fully filtered comb filtered luminance signal is coupled to luminance processing channel 50. In response to the other extreme level of control signal a full bandwidth comb filtered luminance signal is coupled to luminance processing channel 50. In response to levels of control signal between these two extremes, a combination of fully filtered and full bandwidth comb filtered luminance signal, with the proportion of each determined by the level of the control signal, is supplied to luminance processing channel 50. An example of such a signal coupler is described in U.S. Patent 4,149,181 entitled "Signal-Dependent Chrominance Subcarrier Filtering Circuit" issued April 10, 1979 to Burdick et al.; see particularly FIGURE 1, elements 40 through 46 and the associated text in column 3, lines 4 through 15.

FIGURE 4 illustrates a control signal generator 30 which generates a continuously variable control signal. The signal representing the top of three

adjacent lines is coupled to one input of subtractor 42; the signal representing the bottom of three adjacent lines is coupled to one input of subtractor 44; and the signal representing the middle of three adjacent lines is coupled to the other inputs of both subtractor 42 and 44 respectively. The outputs of subtractors 42 and 44 are coupled to envelope detectors 46 and 48 respectively (which do not include threshold detectors). The outputs of envelope detectors 46 and 48 are coupled to respective inputs of a minimizing non-additive mixer 50. The minimizing non-additive mixer functions to pass the signal applied to its input terminals which has the lesser magnitude. The output of minimizing non-additive mixer 50 is coupled to a function circuit 52 which produces at its output, a signal which is a function (possibly a non-linear function) of the signal at its input.

If the top, middle and bottom lines all have the same magnitude of color representative information, the outputs of both subtractors 42 and 44 and consequently both envelope detectors 46 and 48 are zero. The minimizing non-additive mixer also passes zero. This value is the value indicating no color representative information and causes the signal coupler unit to pass the full bandwidth color difference signal.

If the middle line has a high magnitude of color representative information relative to the top or bottom lines, then the outputs of the envelope detectors 46 and 48 are greater than zero. The lesser is passed through the function circuit 52 to cause some combination of non-filtered and filtered comb filtered luminance signal to be supplied to the luminance processing channel.

The image transition detector above has been described in an embodiment for detecting chrominance transitions and for correcting the comb filtered luminance component signal. It will be understood that such an image detector may also be used to detect high horizontal detail luminance transitions, and to correct the comb filtered chrominance component signal. In such a system, the comb filtered chrominance signal from the previous line is substituted for the contaminated one.

The above embodiments may be implemented in either continuous or sampled data form. Any sampled data embodiment may be implemented in either analog or digital form.

Claims

1. A video signal processor, including a comb filter (10) for producing a comb filtered component signal (Y or C), a component processing channel (50), and means (40) for coupling said comb filtered component signal to said component processing channel, said coupling means



including means for altering the composition of said comb filtered component signal in response to a control signal; characterized by an image transition detector which comprises:

means (20) responsive to said comb filtered component signal for detecting signals in the band of frequencies normally occupied by another component signal for a given line and two lines adjacent said given line; and

means (30) coupled to said detecting means for generating said control signal in response to the relative levels of said detected signals for said given line and said adjacent lines.

2. A video signal processor according to Claim 1, wherein said signal detecting means comprises:

an input terminal for applying said comb filtered component signal (Y);

bandpass filter means (22) coupled to said input terminal for passing only signals in the band of frequencies normally occupied by said other component signal, and delay means (26, 28) serially coupled with said bandpass filter means for producing at respective output terminals signals delayed by one and two delay periods, respectively.

3. A video signal processor according to Claim 2, wherein said signal detecting means further comprises digitizing means (24) coupled between the output of said bandpass filter means and the input of said delay means for producing signals at said output terminals having first and second states.

4. A video signal processor according to Claim 3, wherein:

said bandpass filter means comprises a bandpass filter coupled to said input terminal for passing the band of frequencies normally occupied by said other component signal;

said digitizing means (24) comprises a threshold detector having an input coupled to the output of said bandpass filter having an output producing a signal having a first state when the level of the signal at said input exceeds a predetermined level, and a second state otherwise; and

said delay means comprises a delay line having an input coupled to said threshold detector, a first output ("MIDDLE") for producing signals from said input delayed by one filter delay period, and a second output ("TOP") for producing signals from said input delayed by two comb filter delay periods.

5. A video signal processor according to Claim 4, wherein said control signal generator comprises:

pattern producing means (32, 34, 36) coupled to the output terminals of said signal detecting means (20) for producing a known pattern of pulses in the presence of an image transition; and

a pattern detector (38) coupled to said pattern producing means for producing said control signal when said known pattern is detected.

6. A video signal processor according to Claim 5, wherein said control signal generating means comprises:

respective inverters (32, 34) coupled to said output of threshold detector and said second output of said delay line; and

an AND gate (36) having respective inputs coupled to said first output of said delay line, and to said respective inverters for producing said known pattern of pulses in the presence of an image transition.

7. A video signal processor according to Claim 1, wherein said control signal generator means comprises:

means (42, 44) responsive to said detected signals for calculating the respective differences between the detected levels of said given line and of said adjacent lines; and

means (50, 52) coupled to said calculating means for generating said control signal which varies as a continuous function of said differences.

8. A video signal processor according to Claim 7, wherein:

said difference calculator comprises a first subtractor (42) having a first input responsive to the detected signal for said given line, a second input responsive to the detected signal for one of said adjacent lines, and an output, a second subtractor (44) having a first input responsive to the detected signal for said given line, a second input responsive to the detected signal for the other of said adjacent lines, and an output, and respective envelope detectors (46, 48) coupled to the output of said first and second subtractors; and

said continuously variable control signal generating means (50, 52) comprises a minimizing non-additive mixer (50) having respective inputs coupled to said respective envelope detectors, and a function circuit (52) coupled to the output of said minimizing non-additive mixer for producing said continuously variable



control signal.

Revendications

1. Système de traitement de signaux video comprenant un filtre à encoches (10) pour produire un signal à composante filtrée en encoches (Y ou C), un canal de traitement de composante (50) et des moyens (40) pour coupler ledit signal à composante filtrée en encoches au canal de traitement de composante, lesdits moyens de couplage comportant des moyens pour altérer la composition dudit signal à composante filtrée en encoches en réponse à un signal de commande, caractérisé par un détecteur de transitions d'images qui comprend :
 - des moyens (20) agissant en réponse audit signal à composante filtrée en encoches pour détecter des signaux dans la bande de fréquences normalement occupées par un autre signal de composante pour une ligne donnée et deux lignes adjacentes à ladite ligne donnée et
 - des moyens (30) couplés aux dits moyens de détection pour générer ledit signal de commande en réponse aux niveaux relatifs desdits signaux détectés pour ladite ligne donnée et lesdites lignes adjacentes.
2. Système de traitement de signaux selon la revendication 1, dans lequel lesdits moyens de détection de signaux comprennent :
 - une borne de sortie pour appliquer ledit signal (Y) à composante filtrée en encoches ;
 - un filtre passe-bande (22) couplé à ladite borne d'entrée pour ne laisser passer que des signaux dans la bande de fréquences normalement occupée par ledit autre signal de composante et des moyens à retard (26.28) couplés en série avec ledit filtre passe-bande pour produire aux bornes de sortie respectives, des signaux retardés d'une et de deux périodes de retard, respectivement.
3. Système de traitement de signaux selon la revendication 2 dans lequel lesdits moyens de détection de signaux comprennent en outre des moyens de numérisation (24) couplés entre la sortie dudit filtre passe-bande et l'entrée desdits moyens de retard pour produire des signaux aux dites bornes de sortie ayant des premier et second états.
4. Système de traitement de signaux selon la

revendication 3, dans lequel :

- ledit filtre passe-bande comprend un filtre passe-bande couplé à ladite borne d'entrée pour laisser passer la bande de fréquence qui est normalement occupée par l'autre signal de composante ;
 - lesdits moyens de numérisation (24) comprennent un détecteur de seuil ayant une entrée couplée à la sortie dudit filtre passe-bande, ayant une sortie produisant un signal présentant un premier état lorsque le niveau du signal à ladite entrée dépasse un niveau prédéterminé et sinon, un second état et ;
 - lesdits moyens de retard comprennent une ligne de retard ayant une entrée couplée audit détecteur de seuil, une première sortie (MILIEU) pour produire des signaux à partir de ladite entrée, retardés d'une période de retard du filtre à encoches et une seconde sortie (SOMMET) pour produire des signaux à partir de ladite entrée, retardés de deux périodes de retard du filtre à encoches.
5. Système de traitement de signaux selon la revendication 4, dans lequel ledit générateur de signaux de commande comprend :
 - des moyens pour produire une configuration (32.34.36) couplés aux bornes de sortie desdits moyens de détection de signaux (20) pour produire une configuration connue d'impulsions en présence d'une transition d'images et,
 - un détecteur de configuration (38) couplé aux dits moyens de production de configuration afin de produire un signal de commande lorsque ladite configuration connue est détectée.
 6. Système de traitement de signaux selon la revendication 5, dans lequel lesdits moyens de génération de signaux de commande comprennent :
 - des inverseurs respectifs (32,34) couplés à ladite sortie du détecteur de seuil et à ladite seconde sortie de la ligne à retard et,
 - une grille ET (36) ayant des entrées respectives couplées à ladite première sortie de ladite ligne à retard et auxdits inverseurs respectifs pour produire ladite configuration connue d'impulsions en présence d'une image de transition.
 7. Système de traitement de signaux selon la revendication 1, dans lequel lesdits moyens de génération de signaux de commande com-



prennent :

- des moyens (42-44) agissant en réponse aux dits signaux détectés pour calculer les différences respectives entre les niveaux détectés de ladite ligne donnée et desdites lignes adjacentes, et
- des moyens (50,52) couplés aux dits moyens de calcul pour générer ledit signal de commande qui varie comme une fonction continue desdites différences.

8. Système de traitement de signaux selon la revendication 7, dans lequel :

- ledit calculateur de différences comprend un premier soustracteur (42) ayant une première entrée agissant en réponse au signal détecté pour ladite ligne donnée, une seconde entrée agissant en réponse au signal détecté pour l'une des lignes adjacentes et une sortie, un second soustracteur (44) ayant une première entrée agissant en réponse au signal détecté pour ladite ligne donnée, une seconde entrée agissant en réponse au signal détecté pour l'autre desdites lignes adjacentes, et une sortie, et des détecteurs d'enveloppe respectifs (46,48), couplés à la sortie desdits premier et second soustracteurs et,
- lesdits moyens (50,52) générant le signal de commande variable de façon continue, comprennent un mélangeur non-additif de minimisation (50) ayant des entrées respectives couplées auxdits détecteurs d'enveloppe respectifs, et un circuit de fonction (52) couplé à la sortie du mélangeur non-additif de minimisation pour produire ledit signal de commande variable de façon continue.

Patentansprüche

1. Videosignal-Verarbeitungseinrichtung mit einem Kammfilter (10) zum Erzeugen eines kammgefilterten Komponentensignals (Y oder C), einem Komponentenverarbeitungskanal (50) und einer Anordnung (40) zum Koppeln des kammgefilterten Komponentensignals auf den Komponentenverarbeitungskanal, wobei die Kopplungsanordnung eine Anordnung zum Ändern der Zusammensetzung des kammgefilterten Komponentensignals unter Steuerung durch ein Steuersignal enthält, **gekennzeichnet durch** einen Bildübergangsdetektor mit einer auf das kammgefilterte Komponentensignal ansprechende Anordnung (20) zum Feststellen von Signalen in einem normalerweise durch ein anderes Komponentensignal ein-

genommenen Frequenzband für eine vorgegebene Zeile und zwei dieser benachbarte Zeilen, und

einer Anordnung (30), die mit der Feststellungsanordnung gekoppelt ist, um das Steuersignal als Reaktion auf die relativen Werte der festgestellten Signale für die vorgegebene Zeile und die benachbarten Zeilen zu erzeugen.

2. Videosignalverarbeitungseinrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß die Signalfeststellungsanordnung enthält:

einen Eingangsanschluß zum Anlegen des kammgefilterten Komponentensignals (Y);

eine Bandpaßfilteranordnung (22), die mit dem Eingangsanschluß gekoppelt ist und nur Signale in dem normalerweise durch das andere Komponentensignal eingenommenen Frequenzband durchläßt, und

eine der Bandpaßfilteranordnung in Reihe geschaltete Verzögerungsanordnung (26, 28), um an entsprechenden Ausgangsanschlüssen Signale, die um eine bzw. zwei Verzögerungsperioden verzögert sind, zu erzeugen.

3. Videosignalverarbeitungseinrichtung nach Anspruch 2, **dadurch gekennzeichnet**, daß die Signalfeststellungsanordnung weiterhin eine zwischen den Ausgang der Bandpaßfilteranordnung und den Eingang der Verzögerungsanordnung gekoppelte Digitalisierungsanordnung (24) zum Erzeugen von Signalen an den beiden Ausgangsanschlüssen, die einen ersten und einen zweiten Zustand aufweisen, enthält.

4. Videosignalverarbeitungseinrichtung nach Anspruch 3, **dadurch gekennzeichnet**, daß

die Bandpaßfilteranordnung ein Bandpaßfilter enthält, das mit dem Eingangsanschluß gekoppelt ist, um das normalerweise durch das andere Komponentensignal eingenommene Frequenzband durchzulassen;

die Digitalisierungsanordnung (24) einen Schwellenwertdetektor enthält, der einen mit dem Ausgang der Bandpaßfilteranordnung gekoppelten Eingang und einen Ausgang aufweist, welcher ein Signal erzeugt, das einen ersten Zustand hat, wenn der Wert des Signales am Eingang einen vorgegebenen Wert überschreitet, und sonst einen zweiten Zustand, und

die Verzögerungsanordnung eine Verzögerungsleitung enthält, die einen mit dem Schwellenwertdetektor gekoppelten Eingang, einen ersten Ausgang ("MIDDLE") zum Erzeugen von Signalen vom Eingang, die um eine Kammfilter-Verzögerungsperiode verzögert sind und einen zweiten Ausgang ("TOP") zum



Erzeugen von Signalen vom Eingang, die um zwei Kammfilter-Verzögerungsperioden verzögert sind, aufweist.

5. Videosignalverarbeitungseinrichtung nach Anspruch 4, **dadurch gekennzeichnet**, daß der Steuersignalgenerator enthält:

eine Mustererzeugungsanordnung (32, 34, 36), die mit den Ausgangsanschlüssen der Signalerfassungsanordnung (20) gekoppelt sind, um ein bekanntes Muster von Impulsen in Gegenwart eines Bildüberganges zu erzeugen, und

einen Musterdetektor (38), der mit der Mustererzeugungsanordnung gekoppelt ist, um das genannte Steuersignal zu erzeugen, wenn das bekannte Muster festgestellt wird.

- Videosignalverarbeitungseinrichtung nach Anspruch 5, **dadurch gekennzeichnet**, daß die Steuersignalerzeugungsanordnung enthält:

entsprechende Invertierer (32, 34), die mit dem Ausgang des Schwellenwertdetektors bzw. dem zweiten Ausgang der Verzögerungsleitung gekoppelt sind, und

ein UND-Glied (36), das mit entsprechenden Eingängen mit dem ersten Ausgang der Verzögerungsleitung und den jeweiligen Invertierern gekoppelt ist, um das bekannte Muster von Impulsen in Gegenwart eines Bildüberganges zu erzeugen.

7. Videosignalverarbeitungseinrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß die Steuersignalgeneratoranordnung enthält:

eine auf die erfaßten Signale reagierende Anordnung (42, 44) zum Errechnen der jeweiligen Differenzen zwischen den festgestellten Werten der vorgegebenen Zeile und der benachbarten Zeilen und

eine mit der Rechenanordnung gekoppelte Anordnung (50, 52) zum Erzeugen des Steuersignals, welches sich als kontinuierliche Funktion der Differenzen ändert.

8. Videosignalverarbeitungseinrichtung nach Anspruch 7, **dadurch gekennzeichnet**, daß

der Differenzrechner einen ersten Subtrahierer (42), der einen auf das festgestellte Signal für die vorgegebene Zeile reagierenden ersten Eingang, einen auf das festgestellte Signal für eine der benachbarten Zeilen reagierenden zweiten Eingang und einen Ausgang aufweist, ferner einen zweiten Subtrahierer (44), der einen auf das festgestellte Signal für die vorgegebene Zeile reagierenden ersten Eingang, einen auf das festgestellte Signal für die andere der benachbarten Zeilen reagieren-

den zweiten Eingang und einen Ausgang aufweist, und entsprechende Hüllkurvendetektoren (46, 48), die mit dem Ausgang des ersten bzw. zweiten Subtrahierers gekoppelt sind, enthält und

daß die das kontinuierlich veränderliche Steuersignal erzeugende Anordnung (50, 52) einen minimierenden nicht-additiven Mischer (50), der entsprechende Eingänge, die mit jeweiligen Hüllkurvendetektoren gekoppelt sind, aufweist, und eine Funktionsschaltung (52), die mit dem Ausgang des minimierenden, nicht-additiven Mixers gekoppelt ist, um das kontinuierlich veränderliche Steuersignal zu erzeugen, enthält.