

Description

The invention relates to a color television signal decoding circuit comprising an analog-to-digital converter having an input for a video signal and an output which is coupled to a first input of a color synchronizing signal phase detection circuit a second input of which is coupled to an output of a first digital oscillator having a clock signal input which, likewise as a clock signal input of the analog-to-digital converter, is coupled to an output of a second digital oscillator which is controllable by means of a clock signal having a stable frequency, a control signal input of the first digital oscillator being coupled to a control signal output of the color synchronizing signal phase detection circuit, a control signal input of the second digital oscillator being coupled to a control signal output of a line synchronizing signal phase detection circuit which is also coupled to the control signal input of the first digital oscillator, and inputs of the line synchronizing signal phase detection circuit being coupled to outputs of the analog-to-digital converter and of the second digital oscillator for receiving signals at the line frequency of the video signal.

A decoding circuit of this type, which is known from European Patent Specification EP-A-0,111,981, is suitable for decoding color television signals having both a fixed and a variable ratio between the line frequency and the chrominance subcarrier frequency of this color television signal.

When processing color television signals which have been decoded by such a decoding circuit and which have a fixed ratio between the line frequency and the chrominance subcarrier frequency, minor position errors are found to be produced between memory information to be written and to be read when using memories for, for example, filtering, noise suppression or field number conversion, whose write and read clock frequencies are in a fixed ratio. Consequently, such signal processing operations may be less accurate.

It is an object of the invention to realize more accurate signal processing operations.

To this end a color television signal decoding circuit of the type described in the opening paragraph is characterized in that the control signal output of the line synchronizing signal phase detection circuit is coupled to an input of a stable state detection circuit for detecting a stable synchronization state, said stable state detection circuit having an output which is coupled to an operation signal input of a coupling correction circuit for realizing, in the stable synchronization state, a coupling between the control signal output of the color synchronizing signal phase detection circuit and the control signal input of the second digital oscillator, a decoupling between the control signal output of the color synchronizing signal phase detection circuit and the control signal input of the first digital oscillator and a coupling between the control signal input of the first digital oscillator and an output of a standard signal generating circuit, and for realizing a decoupling between the control signal output of the line synchronizing signal phase detection circuit and the control signal inputs of the first and the second digital oscillator.

In the stable synchronization state of the line synchronizing signal phase detection circuit, i.e. the state at which the said fixed ratio occurs between the line frequency and the chrominance subcarrier frequency, this measure eliminates the influence of this line synchronizing signal phase detection circuit on the control of the two digital oscillators and only the second digital oscillator is controlled by the color synchronizing signal phase detection circuit. Noise and interference in the line synchronizing signal then no longer have any influence on the digital oscillators so that they are found to be operating more accurately and the decoded color television signals can be processed more accurately.

The invention will now be described in greater detail, by way of example, with reference to the accompanying drawings in which

Fig. 1 is a concise block diagram of a possible embodiment of a color television signal decoding circuit according to the invention,

Fig. 2 is a more detailed circuit diagram of a part of a standard signal generating circuit for an NTSC version of a color television decoding circuit according to the invention,

Fig. 3 is a concise block diagram of another possible embodiment of a color television signal decoding circuit according to the invention, and

Fig. 4 is a block diagram of a possible embodiment of a coupling correction circuit for the embodiment of Fig. 3.

In Fig. 1 a video signal comprising a luminance signal, synchronizing signals and a chrominance signal is applied to an input 1 of an analog-to-digital converter 3.

A digitized video signal whose color synchronizing signal of the chrominance signal is applied to a first input 7 of a color synchronizing signal phase detection circuit 9 is obtained from an output 5 of the A/D converter 3.

For the sake of clarity the signal paths for the digital signals are shown in a single form and the Figure does not include separation circuits for the different parts of the digitized video signal, which circuits are not important for understanding the invention.

A second input 11 of the color synchronizing signal phase detection circuit 9 receives a reference signal

at the chrominance subcarrier frequency f_s of the chrominance signal from an output 13 of a first digital oscillator 15.

A clock signal input 17 of the first digital oscillator 15 and a clock signal input 19 of the A/D converter 3 are connected to an output 21 of a waveform correction circuit 23 an output 25 of which is connected to an output 27 of a second digital oscillator 29. These clock signal inputs 17, 19 receive a clock signal at a frequency of n times the line frequency, hence nf_H . A clock signal input 31 of the second digital oscillator 29 receives a clock signal at a frequency f_c from an output 33 of a stable oscillator 35 in the form of a crystal oscillator.

The output signals of the A/D converter 3 and of the first digital oscillator 15 are sampled at the frequency nf_H of the clock signal supplied by the second digital oscillator 29 and the waveform correction circuit 23 so that the output signal of the first digital oscillator 15 can be used for demodulating the chrominance signal of the digitized video signal.

A control signal input 37 of the first digital oscillator 15 receives a digital signal combination having a value of $\frac{f_s}{nf_H}$ from a first output 39 of a coupling correction circuit 41. In the shown state of the coupling correction circuit 41 this signal combination originates from a first input 43 thereof which is connected to an output 45 of a first divider circuit 47 and which is controlled via this divider circuit 47. In the non-shown state of the coupling correction circuit this signal combination originates from a second input 49 thereof which is connected to an output 51 of a standard signal generating circuit 53 and then has a constant value $\frac{f_s}{nf_H}$ the reference f_s denoting the standard subcarrier frequency and the reference f_H denoting the standard line frequency.

A control signal input 55 of the second digital oscillator 29 is connected to a second output 59 of the coupling correction circuit 41 and receives a digital signal combination having a value of $\frac{nf_H}{f_c}$. In the shown state of the coupling correction circuit 41 this signal combination originates from a third input 61 thereof which is connected to a control signal output 63 of a line synchronizing signal phase detection circuit 65. This signal combination is then controlled by this line synchronizing signal phase detection circuit 65. In the non-shown state of the coupling correction circuit 41 this signal combination originates from a fourth input 67 thereof which is connected to the output 45 of the first divider circuit 47. This signal combination is the controlled via this first divider circuit 47.

Each digital oscillator 15, 29 may be formed with a modulo-one-adder an input of which is connected via a memory circuit to the relevant control signal input and another input of which is connected to an output of a delay circuit controlled by the relevant clock signal, which delay circuit has a delay of one period of the relevant clock signal, while the output of the modulo-one-adder is connected to the input of the delay circuit. The frequency of the output signal of such a digital oscillator is equal to the product of the value of the digital signal combination at the control signal input and the clock frequency. Its output signal is a signal sampled at the relevant clock signal frequency.

The divider circuit 47 receives a controllable digital signal combination having a value of $\frac{f_s}{f_c}$ at an input 69, which is connected to a control signal output 71 of the color synchronizing signal phase detection circuit 9. A further input 73 of the divider circuit 47 is connected to a third output 75 of the coupling correction circuit 41 and in the shown state of the coupling correction circuit 41 it receives the controllable digital signal combination having the value of $\frac{nf_H}{f_c}$ from a fifth input 77 which is connected to the output 63 of the line synchronizing signal phase detection circuit 65. In the non-shown state of the coupling correction circuit 41 the third output 75 of the coupling correction circuit 41 receives the constant digital signal combination $\frac{f_s}{nf_H}$ from a sixth input 79 thereof, which is connected to the output 51 of the standard signal generating circuit 53.

As a result, the divider circuit 47 supplies at its output 45 a digital signal combination of the value

$$\frac{f_s}{f_c} \cdot \frac{nf_H}{f_c} = \frac{f_s}{nf_H}$$

in the shown state of the coupling correction circuit 41 and a digital signal combination of the value

$$\frac{f_s}{f_c} \cdot \frac{f_s}{nf_H} = \frac{nf_H}{f_c} \cdot \frac{f_s}{f_s}$$

in the non-shown state of the coupling correction circuit 41. The non-shown state of the coupling correction

circuit 41 occurs when $f_s = f_c$, so that this value is then $\frac{nf_H}{f_c}$. The second digital oscillator 29 is then controlled by the color synchronizing signal phase detection circuit 9 via the first divider circuit 47, while the first digital oscillator 15 is not controlled and operates at its standard frequency.

The non-shown state of the coupling correction circuit 41 is brought about by an operation signal applied to an operation signal input 81 and originating from an output 83 of a stable state detection circuit 85. This operation signal occurs when an input 87 of the stable state detection circuit 85 connected to the output 63 of the line synchronizing phase detection circuit 65 has, on an average, the same digital signal combination for some time as an input 89 thereof. The digital signal combination applied to the input 89 originates from an output 91 of the standard signal generating circuit 53 and has the value $\frac{nf_H}{f_c}$. Furthermore, a color killer signal applied to an input 93 of the coupling correction circuit 85 and originating from an output 95 of the color synchronizing signal phase detection circuit 9 must indicate that a color synchronizing signal of the correct frequency and phase is received by the color synchronizing signal phase detection circuit 9.

The line synchronizing phase detection circuit 65 supplies from its output 63 the digital signal combination of the value $\frac{nf_H}{f_c}$ as a result of a phase comparison of two line frequency signals applied to inputs 97 and 99 thereof. The signal applied to the input 97 is obtained via a frequency divider 101 having a divisor of n from the clock signal occurring at the output 21 of the waveform correction circuit 23. A line synchronizing signal which is derived from the signal at the output 5 of the A/D converter 3 via a synchronizing signal separating circuit 103 is applied to the input 99.

The operation of the decoding circuit without the coupling correction circuit 41 is described in greater detail in European Patent Specification 0,111,981 which is herein incorporated by reference.

If desired, the coupling correction circuit 41 may be formed differently, for example, its fifth input 77 may be connected to the second output 59 of the coupling correction circuit 41 instead of to the output 63 of the line synchronizing signal phase detection circuit 65, or its third input 61 may be connected to the third output 75 of the coupling correction circuit 41 instead of the output 63 of the line synchronizing signal phase detection circuit 65.

It is also possible to connect the third input 67 to a third output of the color synchronizing signal phase detection circuit 9 instead of to the output 45 of the divider circuit 47, if it is adapted to supply a digital signal combination of the value $\frac{nf_H}{f_c}$ at this third output. The switch-over of the signal at the input 73 of the first divider circuit 47 by means of the third output 75 and the fifth and the sixth input 77, 79 of the coupling correction circuit 41 can then be dispensed with.

The digital signal combination of the value $\frac{nf_H}{f_c}$ which appears at the output 91 of the standard signal generating circuit 53 can generally be obtained in a simple manner because the frequency f_c can be suitably chosen and because a possible small deviation in the circuit can be taken into account.

If desired, the digital signal combination $\frac{f_s}{nf_H}$ can be derived by means of the clock signal nf_H in a manner indicated in, for example, Fig. 2.

Although the clock signal nf_H may have a variable frequency, its frequency is constant if the standard signal $\frac{f_s}{nf_H}$ at the output 51 of the standard signal generating circuit 53 must be used, as will then be established by the stable state detection circuit 85, which circuit in that case only brings the coupling correction circuit 41 to the state which is not shown.

The sixteen-bit output combination 51 of the standard signal generating circuit 53 shown in Fig. 2 gives the value 0100001111100001 in the shown state of a change-over switch 105 and the value 0100001111000111 in the state which is not shown. These binary values correspond to the decimal numbers 17377 and 17351 = 17377 - 26.

The change-over switch 105 is operated by the output signal of an AND-gate 107 an input of which receives the clock signal of the frequency nf_H in which n is chosen to be 858 and another input of which receives the output signal of a frequency divider 109 which divides the frequency of the clock signal by 858 and each time supplies a pulse per line period with a duration corresponding to that of a pulse of the clock signal.

The average value of the digital signal combination at the output 51 will then be

$$\frac{857 \times 17377 + 17351}{858} = \frac{14909440}{858} = \frac{227,5 \times 2^{16}}{858} = \frac{227,5 f_{H_0} \cdot 2^{16}}{858 f_{H_0}} = \frac{f_{s_0}}{nf_{H_0}} \cdot 2^{16}$$

Since the most significant bit as the first bit behind the comma, that is to say, as the power -1 of two is applied to the first divider circuit 47, this value must be divided by 2^{16} so as to obtain the value at the input 73 of the first divider circuit 47. This average value thus becomes the desired value

$$\frac{f_{s_0}}{nf_{H_0}}$$

The maximum deviation which occurs periodically is 0.143 degree.

In Fig. 3 corresponding components have the same reference numerals as those in the previous Figures. This Figure differs from Fig. 1 in that a second divider circuit 121 is provided and in that the coupling correction circuit 41 has only four inputs 43, 49, 61, 67 and two outputs 39, 59.

A first input 123 of the second divider circuit 121 is connected to the control signal output 71 of the color synchronizing signal phase detection circuit 9 and receives the digital signal combination of the value $\frac{f_{s_0}}{f_c}$. A second input 125 of the second divider circuit 121 is connected to the output 51 of the standard signal generating circuit 53 and receives the digital signal combination of the value $\frac{f_{s_0}}{nf_{H_0}}$.

An output 127 of the second divider circuit 121 is connected to the fourth input 67 of the coupling correction circuit 41 and applies the digital signal combination of the value

$$\frac{f_{s_0}}{f_c} : \frac{f_{s_0}}{nf_{H_0}} =$$

$$\frac{nf_{H_0}}{f_c} \text{ to this input.}$$

As in Fig. 1, the first digital oscillator 15 is controlled by the color synchronizing signal phase detection circuit 9 and the second digital oscillator 29 is controlled by the line synchronizing signal phase detection circuit 65 in the shown state of the coupling correction circuit 41. In the non-shown state of the coupling correction circuit 41 the first digital oscillator 15 is not controlled and the second digital oscillator 29 is controlled by the color synchronizing signal phase detection circuit 9, as was also the case in Fig. 1.

If the stable state detection circuit 85 is formed in such a way that it supplies a signal from its output 83 with an amplitude depending on the extent of frequency stability of the output signal of the line synchronizing signal phase detection circuit 65, the change-over switches of the coupling correction circuit 41 can be replaced by potentiometer circuits an example of which is shown in Fig. 4.

In the coupling correction circuit 41 of Fig. 4 the first and third inputs 43 and 61 are connected to first inputs 131 and 133 of first and second subtractor circuits 135 and 137, respectively, and to first inputs 139 and 141 of third and fourth subtractor circuits 143 and 145, respectively, outputs 147 and 149 of which are connected to the first and second outputs 39 and 59, respectively, of the coupling correction circuit 41. The second and fourth inputs 49 and 67 of the coupling correction circuit 41 are connected to second inputs 151 and 153 of the first and second subtractor circuits 135 and 137, respectively, outputs 155 and 157 of which are connected to inputs 158 and 160 of multipliers 159 and 161, respectively. Further inputs 163 and 165 of the multipliers 159 and 161, respectively, are connected to the operation signal input 81, and outputs 167 and 169 are connected to second inputs 171 and 173 of the third and fourth subtractor circuits 143 and 145, respectively.

If the amplitude of the signal is equal to P at the first input 43 and Q at the second input 49 and if the amplitude of the operation signal at the operation signal input 81 is equal to k, the signal at the output 39 has an amplitude $P - k(P - Q) = kQ + (1 - k)P$. For $k = 0$ this is P and for $k = 1$ this is Q, for intermediate values of k this is a value which corresponds to a value supplied by a potentiometer.

If the inputs 131, 151 and 133, 153 of the first and second subtractor circuits 135 and 137, respectively, are interchanged, the third and fourth subtractor circuits 143 and 145, respectively, may become adder circuits.

In a manner corresponding to that indicated with reference to Fig. 2 the average value of the digital number to be supplied by the standard signal generating circuit 53 at its output 51 can, for example, be calculated as follows for a PAL decoding circuit for which $n = 864$ and $f_{s_0} = 283.7516 f_{H_0}$:

$$\frac{f_{s_0}}{nf_{H_0}} = \frac{283,7516 f_{H_0}}{864 f_{H_0}} =$$

$$\frac{283,7516}{864} =$$

$$\frac{625 \times 283,7516}{625 \times 864} =$$

$$\frac{709379}{625 \times 864} \cdot 2^{-2} =$$

$$\frac{46489862144}{625 \times 864} \cdot 2^{-18} =$$

$$\frac{621(860 \times 86092 + 4 \times 86165) + 4(860 \times 86092 + 3 \times 86165 + 86076)}{625 \times 864} \cdot 2^{-18}$$

This means that per picture period during 621 line periods the number 86092×2^{-18} must be supplied as long as 860 clock periods and the number 86165×2^{-18} as long as 4 clock periods, and during 4 line periods the number 86092×2^{-18} must be supplied as long as 860 clock periods, the number 86165×2^{-18} as long as three clock periods and the number 86076×2^{-18} as long as one clock period, in which

$$86092 \times 2^{-18} = 010101\ 0000\ 01001100$$

$$86165 \times 2^{-18} = 010101\ 0000\ 10010101$$

$$86076 \times 2^{-18} = 010101\ 0000\ 00111100$$

The maximum deviation which then occurs periodically is 0.12 degree.

Claims

1. A color television signal decoding circuit comprising an analog-to-digital converter (3) having an input (1) for a video signal and an output (5) which is coupled to a first input (7) of a color synchronizing signal phase detection circuit (9) a second input (11) of which is coupled to an output (13) of a first digital oscillator (15) having a clock signal input (17) which, likewise as a clock signal input (19) of the analog-to-digital converter, is coupled to an output (27) of a second digital oscillator (29) which is controllable by means of a clock signal (f_c) having a stable frequency, a control signal input (37) of the first digital oscillator (15) being coupled to a control signal output (71) of the color synchronizing signal phase detection circuit, a control signal input (55) of the second digital oscillator (29) being coupled to a control signal output (63) of a line synchronizing signal phase detection circuit (65) which is also coupled (via 47) to the control signal input (37) of the first digital oscillator (15), and inputs (99, 97) of the line synchronizing signal phase detection circuit (65) being coupled to outputs (5, 27) of the analog-to-digital converter (3) and of the second digital oscillator (29) for receiving signals at the line frequency of the video signal, characterized in that the control signal output (63) of the line synchronizing signal phase detection circuit (65) is coupled to an input (87) of a stable state detection circuit (85) for detecting a stable synchronization state, said stable state detection circuit (85) having an output (83) which is coupled to an operation signal input (81) of a coupling correction circuit (41) for realizing, in the stable synchronization state, a coupling between the control signal output (71) of the color synchronizing signal phase detection circuit (9) and the control signal input (55) of the second digital oscillator (29), a decoupling between the control signal output (71) of the color synchronizing signal phase detection circuit (9) and the control signal input (37) of the first digital oscillator (15) and a coupling between the control signal input (37) of the first digital oscillator (15) and an output (51) of a standard signal generating circuit (53), and for realizing a decoupling between the control signal output (63) of the line synchronizing signal phase detection circuit (65) and the control signal inputs (37, 55) of the first and the second digital oscillator.
2. A color television signal decoding circuit as claimed in Claim 1, characterized in that the coupling correction circuit (41) has a first output (39) which can be connected to a first input (43) or a second input (49) of the coupling correction circuit and a second output (59) which can be connected to a third input (65) or a fourth input (67) of the coupling correction circuit (41), said first and second outputs being coupled to the control signal inputs (37, 55) of the first and second digital oscillators (15 and 29, respectively), the first input (43) of the coupling correction circuit (41) being coupled to an output (45) of a first divider circuit (47) which has a first input (69) which is coupled to the control signal output (71) of the color synchronizing signal phase detection circuit (9) and a second input (73) which is coupled to the control signal output (63) of the line synchronizing signal phase detection circuit, the second input (49) of the coupling correction circuit (41) being coupled to the output (51) of the standard signal generating circuit (53), the third input (61) of the coupling correction circuit being coupled to the control signal output (63) of the line synchronizing signal phase detection circuit (65) and the fourth input (67) of the coupling correction circuit (41) being



$$\frac{283,7516}{864} =$$

$$\frac{625 \times 283,7516}{625 \times 864} =$$

$$\frac{709379}{625 \times 864} \cdot 2^{-2} =$$

$$\frac{46489862144}{625 \times 864} \cdot 2^{-18} =$$

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This means that per picture period during 621 line periods the number 86092×2^{-18} must be supplied as long as 860 clock periods and the number 86165×2^{-18} as long as 4 clock periods, and during 4 line periods the number 86092×2^{-18} must be supplied as long as 860 clock periods, the number 86165×2^{-18} as long as three clock periods and the number 86076×2^{-18} as long as one clock period, in which

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The maximum deviation which then occurs periodically is 0.12 degree.

Claims

1. A color television signal decoding circuit comprising an analog-to-digital converter (3) having an input (1) for a video signal and an output (5) which is coupled to a first input (7) of a color synchronizing signal phase detection circuit (9) a second input (11) of which is coupled to an output (13) of a first digital oscillator (15) having a clock signal input (17) which, likewise as a clock signal input (19) of the analog-to-digital converter, is coupled to an output (27) of a second digital oscillator (29) which is controllable by means of a clock signal (f_c) having a stable frequency, a control signal input (37) of the first digital oscillator (15) being coupled to a control signal output (71) of the color synchronizing signal phase detection circuit, a control signal input (55) of the second digital oscillator (29) being coupled to a control signal output (63) of a line synchronizing signal phase detection circuit (65) which is also coupled (via 47) to the control signal input (37) of the first digital oscillator (15), and inputs (99, 97) of the line synchronizing signal phase detection circuit (65) being coupled to outputs (5, 27) of the analog-to-digital converter (3) and of the second digital oscillator (29) for receiving signals at the line frequency of the video signal, characterized in that the control signal output (63) of the line synchronizing signal phase detection circuit (65) is coupled to an input (87) of a stable state detection circuit (85) for detecting a stable synchronization state, said stable state detection circuit (85) having an output (83) which is coupled to an operation signal input (81) of a coupling correction circuit (41) for realizing, in the stable synchronization state, a coupling between the control signal output (71) of the color synchronizing signal phase detection circuit (9) and the control signal input (55) of the second digital oscillator (29), a decoupling between the control signal output (71) of the color synchronizing signal phase detection circuit (9) and the control signal input (37) of the first digital oscillator (15) and a coupling between the control signal input (37) of the first digital oscillator (15) and an output (51) of a standard signal generating circuit (53), and for realizing a decoupling between the control signal output (63) of the line synchronizing signal phase detection circuit (65) and the control signal inputs (37, 55) of the first and the second digital oscillator.
2. A color television signal decoding circuit as claimed in Claim 1, characterized in that the coupling correction circuit (41) has a first output (39) which can be connected to a first input (43) or a second input (49) of the coupling correction circuit and a second output (59) which can be connected to a third input (65) or a fourth input (67) of the coupling correction circuit (41), said first and second outputs being coupled to the control signal inputs (37, 55) of the first and second digital oscillators (15 and 29, respectively), the first input (43) of the coupling correction circuit (41) being coupled to an output (45) of a first divider circuit (47) which has a first input (69) which is coupled to the control signal output (71) of the color synchronizing signal phase detection circuit (9) and a second input (73) which is coupled to the control signal output (63) of the line synchronizing signal phase detection circuit, the second input (49) of the coupling correction circuit (41) being coupled to the output (51) of the standard signal generating circuit (53), the third input (61) of the coupling correction circuit being coupled to the control signal output (63) of the line synchronizing signal phase detection circuit (65) and the fourth input (67) of the coupling correction circuit (41) being



coupled to an output (127) of a second divider circuit (121) a first input (123) of which is coupled to the control signal output (71) of the color synchronizing signal phase detection circuit (9) and a second input (125) of which is coupled to the output (51) of the standard signal generating circuit (53).

3. A color television signal decoding circuit as claimed in Claim 2, characterized in that potentiometer circuits (135, 159, 143 and 137, 161, 145), which can be operated by the operation signal to be applied to the operation signal input (81), are incorporated in the coupling correction circuit between the first and the second input (43, 49) and the first output (39) and between the third and the fourth input (61, 67) and the second output (59), respectively.
4. A color television signal decoding circuit as claimed in Claim 1, 2 or 3, characterized in that the standard signal generating circuit comprises a circuit for obtaining at its first output (51) a standard signal from the clock signal (nf_H) of the analog-to-digital converter (3) and the first digital oscillator (15).

Patentansprüche

1. Farbfernsehsignal-Decoderschaltung mit einem Analog-Digital-Wandler (3) mit einem Eingang (1) für ein Video-Signal und mit einem Ausgang (5), der mit einem ersten Eingang (7) einer Farbsynchronsignal-Phasendetektorschaltung (9) gekoppelt ist, von der ein zweiter Eingang (11) mit einem Ausgang (13) eines ersten digitalen Oszillators (15) gekoppelt ist, der einen Taktimpulssignaleingang (17) hat, der ebenso wie ein Taktimpulssignaleingang (19) des Analog-Digital-Wandlers mit einem Ausgang (27) eines zweiten digitalen Oszillators (29) gekoppelt ist, der durch ein Taktimpulssignal (f_a) mit einer stabilen Frequenz regelbar ist, wobei ein Regelsignaleingang (37) der ersten digitalen Oszillators (15) mit einem Regelsignalausgang (71) der Farbsynchronsignal-Phasendetektorschaltung gekoppelt ist, während ein Regelsignaleingang (55) des zweiten digitalen Oszillators (29) mit einem Regelsignalausgang (63) einer Zeilensynchronsignal-Phasendetektorschaltung (65) gekoppelt ist, die zugleich (über 47) mit dem Regelsignaleingang (37) der ersten digitalen Oszillators (15) gekoppelt ist und wobei Eingänge (99, 97) der Zeilensynchronsignal-Phasendetektorschaltung (65) mit Ausgängen (5, 27) des Analog-Digital-Wandlers (3) und des zweiten digitalen Oszillators (29) gekoppelt sind zum Erhalten von Signalen mit der Zeilenfrequenz des Video-Signals, dadurch gekennzeichnet, daß der Regelsignalausgang (63) der Zeilensynchronsignal-Phasendetektorschaltung (65) mit einem Eingang (87) einer Stabilzustandsdetektorschaltung (85) zum Detektieren eines stabilen Synchronzustandes gekoppelt ist, wobei diese Stabilzustandsdetektorschaltung (85) einen Ausgang (83) hat, der mit einem Bedienungssignaleingang (81) einer Kopplungskorrekturschaltung (41) zum in dem stabilen Synchronzustand Erhalten einer Kopplung zwischen dem Regelsignalausgang (71) der Farbsynchronsignal-Phasendetektorschaltung (9) und dem Regelsignaleingang (55) des zweiten digitalen Oszillators (29), einer Entkopplung zwischen dem Regelsignalausgang (71) der Farbsynchronsignal-Phasendetektorschaltung (9) und dem Regelsignaleingang (37) der ersten digitalen Oszillators (15) und einer Kopplung zwischen dem Regelsignaleingang (37) des ersten digitalen Oszillators (15) und einem Ausgang (51) einer Normsignalerzeugungsschaltung (53), und zum Erhalten einer Entkopplung zwischen dem Regelsignalausgang (63) der Zeilensynchronsignal-Phasendetektorschaltung (65) und dem Regelsignaleingang (37, 55) der ersten und des zweiten digitalen Oszillators gekoppelt ist.
2. Farbfernsehsignal-Decoderschaltung nach Anspruch 1, dadurch gekennzeichnet, daß die Kopplungskorrekturschaltung (41) einen ersten Ausgang (39) aufweist, der mit einem ersten (43) oder einem zweiten (49) Eingang der Kopplungskorrekturschaltung verbindbar ist, und einen zweiten Ausgang (59), der mit einem dritten (65) oder einem vierten (67) Eingang der Kopplungskorrekturschaltung (41) verbindbar ist, wobei dieser erste bzw. zweite Ausgang mit dem Regelsignaleingang (37 bzw. 55) des ersten bzw. zweiten digitalen Oszillators (15 bzw. 29) gekoppelt ist, während der erste Eingang (43) der Kopplungskorrekturschaltung (41) mit einem Ausgang (45) einer ersten Teilerschaltung (47) gekoppelt ist, die einen ersten Eingang (69) aufweist, der mit dem Regelsignalausgang (71) der Farbsynchronsignal-Phasendetektorschaltung (9) gekoppelt ist und einen zweiten Eingang (73), der mit dem Regelsignalausgang (63) der Zeilensynchronsignal-Phasendetektorschaltung gekoppelt ist, der zweite Eingang (49) der Kopplungskorrekturschaltung (41) mit einem Ausgang (51) der Normsignalerzeugungsschaltung (53) gekoppelt ist, der dritte Eingang (61) der Kopplungskorrekturschaltung mit dem Regelsignalausgang (63) der Zeilensynchronsignal-Phasendetektorschaltung (65) gekoppelt ist, und der vierte Eingang (67) der Kopplungskorrekturschaltung (41) mit einem Ausgang (127) einer zweiten Teilerschaltung (121) gekoppelt ist, von der ein er-



ster Eingang (123) mit dem Regelsignalausgang (71) der Farbsynchronsignal-Phasendetektorschaltung (9) gekoppelt ist und ein zweiter Eingang (125) mit dem zweiten Ausgang (51) der Normsignalerzeugungsschaltung (53) gekoppelt ist.

- 5 3. Farbfernsehsignal-Decoderschaltung nach Anspruch 2, dadurch gekennzeichnet, daß in der Kopplungskorrekturschaltung zwischen dem ersten und dem zweiten (43 bzw. 49) Eingang und dem ersten Ausgang (39) bzw. zwischen dem dritten und vierten (61 bzw. 67) Eingang und dem zweiten Ausgang (59), durch das dem Bedienungssignaleingang (81) zuzuführende Bedienungssignal bedienbare Potentiometerschaltungen (135, 159, 143 bzw. 137, 161, 145) vorgesehen sind.
- 10 4. Farbfernsehsignal-Decoderschaltung nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß die Normsignalerzeugungsschaltung eine Schaltungsanordnung aufweist zum an dem ersten Ausgang (51) derselben Erhalten eines Normsignals aus dem Taktimpulssignal (nf_H) des Analog-Digital-Wandlers (3) und des ersten digitalen Oszillators (15).

Revendications

1. Circuit de décodage de signaux de télévision en couleurs comprenant un convertisseur analogique-numérique (3) comportant une entrée (1) pour un signal vidéo et une sortie (5) qui est couplée à une première entrée (7) d'un circuit de détection de phase de signal de synchronisation couleur (9) dont une seconde entrée (11) est couplée à une sortie (13) d'un premier oscillateur numérique (15) comportant une entrée de signal d'horloge (17) qui, tout comme une entrée de signal d'horloge (19) du convertisseur analogique-numérique, est couplée à une sortie (27) d'un second oscillateur numérique (29) qui peut être commandé au moyen d'un signal d'horloge (f_c) ayant une fréquence stable, une entrée de signal de commande (37) du premier oscillateur numérique (15) étant couplée à une sortie de signal de commande (71) du circuit de détection de phase de signal de synchronisation couleur, une entrée de signal de commande (55) du second oscillateur numérique (29) étant couplée à une sortie de signal de commande (63) d'un circuit de détection de phase de signal de synchronisation de ligne (65) qui est également couplée (par 47) à l'entrée de signal de commande (37) du premier oscillateur numérique (15), et des entrées (99, 97) du circuit de détection de phase de signal de synchronisation de ligne (65) étant couplées à des sorties (5, 27) du convertisseur analogique-numérique (3) et du second oscillateur numérique (29) pour recevoir des signaux à la fréquence de ligne du signal vidéo, caractérisé en ce que la sortie de signal de commande (63) du circuit de détection de phase de signal de synchronisation de ligne (65) est couplée à une entrée (87) d'un circuit de détection d'état stable (85) pour détecter un état de synchronisation stable, le circuit de détection d'état stable (85) comportant une sortie (83) qui est couplée à une entrée de signal d'opération (81) d'un circuit de correction de couplage (41) pour réaliser, dans l'état de synchronisation stable, un couplage entre la sortie de signal de commande (71) du circuit de détection de phase de signal de synchronisation couleur (9) et l'entrée de signal de commande (55) du second oscillateur numérique (29), un découplage entre la sortie de signal de commande (71) du circuit de détection de phase de signal de synchronisation couleur (9) et l'entrée de signal de commande (37) du premier oscillateur numérique (15) et un couplage entre l'entrée de signal de commande (37) du premier oscillateur numérique (15) et une sortie (51) d'un circuit générateur de signal standard (53), et pour réaliser un découplage entre la sortie de signal de commande (63) du circuit de détection de phase de signal de synchronisation de ligne (65) et les entrées de signal de commande (37, 55) du premier et du second oscillateur numérique.
2. Circuit de décodage de signaux de télévision en couleurs suivant la revendication 1, caractérisé en ce que le circuit de correction de couplage (41) comporte une première sortie (39) qui peut être couplée à une première entrée (43) ou une deuxième entrée (49) du circuit de correction de couplage et une seconde sortie (59) qui peut être couplée à une troisième entrée (65) ou une quatrième entrée (67) du circuit de correction de couplage (41), la première et la seconde sortie étant couplées aux entrées de signaux de commande (37, 55) du premier et du second oscillateur numérique (15 et 29, respectivement), la première entrée (43) du circuit de correction de couplage (41) étant couplée à une sortie (45) d'un premier circuit diviseur (47) qui comporte une première entrée (69) qui est couplée à la sortie de signal de commande (71) du circuit de détection de phase de signal de synchronisation couleur (9) et une seconde entrée (73) qui est couplée à la sortie de signal de commande (63) du circuit de détection de phase de signal de synchronisation de ligne, la seconde entrée (49) du circuit de correction de couplage (41) étant couplée à la sortie (51) du circuit générateur de signal standard (53), la troisième entrée (61) du circuit de correction



de couplage étant couplée à la sortie de signal de commande (63) du circuit de détection de phase de signal de synchronisation de ligne (65) et la quatrième entrée (67) du circuit de correction de couplage (41) étant couplée à une sortie (127) d'un second circuit diviseur (121) dont une première entrée (123) est couplée à la sortie de signal de commande (71) du circuit de détection de phase de signal de synchronisation couleur (9) et dont une seconde entrée (125) est couplée à la sortie (51) du circuit générateur de signal standard (53).

3. Circuit de décodage de signaux de télévision en couleurs suivant la revendication 2, caractérisé en ce que des circuits potentiométriques (135, 159, 143 et 137, 161, 145), qui peuvent être actionnés par le signal d'opération à appliquer à l'entrée de signal d'opération (81), sont incorporés dans le circuit de correction de couplage entre la première et la seconde entrée (43, 49) et la première sortie (39) et entre la troisième et la quatrième entrée (61, 67) et la seconde sortie (59), respectivement.
4. Circuit de décodage de signaux de télévision en couleurs suivant la revendication 1, 2 ou 3, caractérisé en ce que le circuit générateur de signal standard comprend un circuit permettant d'obtenir, à sa première sortie (51), un signal standard à partir du signal d'horloge (nfh) du convertisseur analogique-numérique (3) et du premier oscillateur numérique (15).