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(54) Display device capable of compensating for luminance of environments

(57) A display device (600) capable of compensating for luminance of an environment is disclosed. The display device (600) includes: a sensor (610), for sensing the luminance of the environment to generate a sensing signal corresponding to the luminance; a scaler (620), coupled to the sensor (610), for processing an original image signal according to the sensing signal to generate an adjusted image signal; and an image outputting device (630), for outputting an image according to the adjusted image signal; wherein the scaler (620) includes: an image signal adjuster (623), for adjusting the original image signal to compensate for the luminance and generate a compensated image signal; and a gain controller (624), coupled to the image signal adjuster (623), for adjusting a gain setting and utilizing the adjusted gain setting to process the compensated image signal in order to generate the adjusted image signal.

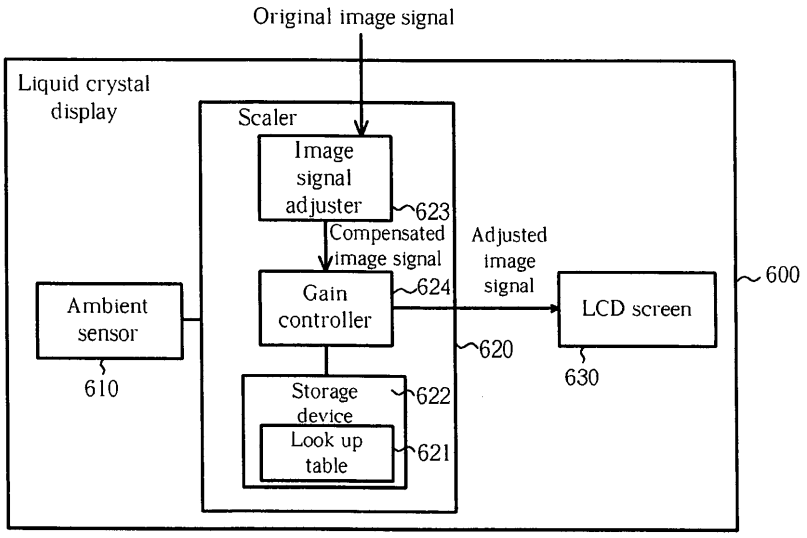

Fig. 6

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Description

[0001] The present invention relates to a luminance compensating display device according to the pre-characterizing clauses of claims 1 and 6.

[0002] In general, a conventional LCD includes an ambient sensor to control the luminance of the backlight module to make the luminance correspond to the luminance of the environment.

[0003] Unfortunately, the above-mentioned adjustment method suffers from two problems. First, the luminance of the backlight module changes the proportions of the RGB colors of the processed image signal thereby introducing distortions to the image. Second, when the luminance of the backlight module is adjusted to be stronger the exposure of the entire image will be too great (meaning that the image is too light), or when the luminance of the backlight module is adjusted to be darker the exposure of the entire image will not be sufficient (meaning that the image is too dark).

[0004] It is therefore one of the primary objectives of the claimed invention to provide a display capable of adjusting display luminance according to the luminance of the environment capable of outputting a clear image, to solve the above-mentioned problems.

[0005] This in mind, the present invention aims at providing a luminance compensating display device that compensates for luminance of environments to output a clear image.

[0006] This is achieved by a luminance compensating display device according to claims 1 and 6. The dependent claims pertain to corresponding further developments and improvements.

[0007] As will be seen more clearly from the detailed description following below, the claimed luminance compensating display device includes a scaler that has an image signal adjuster and a gain controller.

[0008] For completeness, various aspects of the invention are described in the following numbered clauses:

1. A display device capable of compensating for luminance of an environment, the display device comprising:

a sensor, for detecting a luminance of an environment to generate a sensing signal;
a scaler, electrically connected to the sensor, for generating an adjusted image signal according to the sensing signal, the scaler comprising:

an image signal adjuster, for compensating for the luminance of the environment according to the sensing signal, and generating a compensated image signal; and
a gain controller, electrically connected to the image signal adjuster, for adjusting a gain setting according to the sensing signal and utilizing the gain setting to amplify the compensated image signal to generate the adjusted image signal; and

an image outputting device, electrically connected to the scaler, for outputting an image according to the adjusted image signal.

2. The display device capable of compensating for luminance of an environment of clause 1, wherein the gain controller adjusts the gain setting further according to a specific γ curve.

3. The display device capable of compensating for luminance of an environment of clause 2, wherein a curvature of the specific γ curve is 2.2.

4. The display device capable of compensating for luminance of an environment of clause 1, wherein the scaler further comprises:

a storage device, electrically connected to the scaler, for storing a look-up table, the look-up table storing a plurality of gain setting adjustment policies;
wherein the gain controller selects a gain setting adjustment policy from the look-up table according to the sensing signal in order to adjust the gain setting.

5. The display device capable of compensating for luminance of an environment of clause 1, wherein the adjusted image signal and the compensated image signal are both composed of RGB signals.

6. A display device capable of compensating for luminance of an environment, the display device comprising:

a display light source;
a sensor, for sensing a luminance of an environment to generate a sensing signal corresponding to the luminance; and
a scaler, electrically connected to the sensor and the display light source, for processing an original image signal according to the sensing signal to generate an adjusted image signal, the scaler comprising:

a light source adjuster, for adjusting the display light source according to the sensing signal to compensate for the luminance;
a gain controller, for adjusting a gain setting according to the sensing signal and utilizing the gain setting to amplify the original image signal to generate the adjusted image signal; and

an image outputting device, electrically connect-

ed to the scaler, for outputting an image according to the adjusted image signal.

7. The display device capable of compensating for luminance of an environment of clause 6, wherein the gain controller adjusts the gain setting further according to a specific γ curve.

8. The display device capable of compensating for luminance of an environment of clause 7, wherein a curvature of the specific γ curve is 2.2.

9. The display device capable of compensating for luminance of an environment of clause 6, further comprising:

a storage device, electrically connected to the scaler, for storing a look-up table, the look-up table storing a plurality of gain setting adjustment policies;
wherein the gain controller selects a gain setting adjustment policy from the look-up table according to the sensing signal in order to adjust the gain setting.

10. The display device capable of compensating for luminance of an environment of clause 6, wherein the adjusted image signal and the compensated image signal are both composed of RGB signals.

[0009] In the following, the invention is further illustrated by way of example, taking reference to the accompanying drawings. Thereof

Fig. 1 is a diagram of a γ =2.2 characteristic curve of a CRT display and a γ =1/2.2 characteristic curve of a video recording device according to the prior art,
Fig. 2 is a diagram of characteristic curves of a LCD,
Fig. 3 is a functional block diagram of an LCD of an embodiment according to the present invention,
Fig. 4 is a flow chart of an operation of the LCD shown in Fig.3 according to the present invention,
Fig. 5 illustrates the determination method of the RGB gain values inside the look-up table,
Fig. 6 is a functional block diagram of an LCD of an embodiment according to the present invention, and
Fig. 7 is a flow chart of an operation of an LCD shown in Fig.6.

[0010] Please refer to Fig. 1, which is a diagram of a γ=2.2 characteristic curve of a CRT display and a γ=1/2.2 characteristic curve of a video recording device according to the prior art. As is well known in the art, the relationship between red-green-blue (RGB) gain values and outputting luminance for human vision complies with the γ =2.2 characteristic curve shown in Fig.1, due to characteristics of CRT displays (such as the response time of the cathode ray tube). In addition, in the past, all displays were CRT displays. Therefore, corresponding video recording devices should have an inverse γ =1/2.2 characteristic curve. For the user, the visual effect can be a linear γ =1 curve (as the dotted line shown in Fig. 1). This makes the image shown on the display resemble the real world.

[0011] Please refer to Fig.2, which is a diagram of characteristic curves of an LCD. If the luminance of the backlight module is directly adjusted, the RGB gain values cannot be adjusted perfectly according to the γ=2.2 characteristic curve. As shown in Fig.2, if the luminance of the backlight module is adjusted to be stronger, the characteristic curve may be shifted from the original γ =2.2 curve to a curve having a lower curvature (for example, r =1.2). On the other hand, if the luminance of the backlight module is adjusted to be darker, the characteristic curve may be shifted from the original γ =2.2 curve to a curve having a higher curvature (for example, γ =3.2). These shifts result in a displayed image that is significantly different from the original γ =2.2 curve, and will therefore have unclear details; the exposure of the entire image will be too great (meaning that the image is too light), or the exposure will not be sufficient (meaning that the image is too dark.)

[0012] Please refer to Fig.3, which is a functional block diagram of an LCD 300 of an embodiment according to the present invention. As shown in Fig.3, the LCD 300 includes an ambient sensor 310, a scaler 320, a liquid crystal display screen (LCD screen) 330, and a backlight module 331. The scaler 320 includes a backlight module adjuster 323, a gain controller 324, and a storage device 322 for storing a look-up table 321. The connection of each device is shown in Fig.3. The scaler 320 is connected to the ambient sensor 310, the backlight module adjuster 323 is connected to the backlight module 331, and the gain controller 324 is connected to the LCD screen 330 and the storage device 322. The backlight module adjuster 323 is utilized to adjust the backlight module (known as a light source) to compensate for the environment luminance according to a sensing signal generated from the ambient sensor. Therefore, the backlight module adjuster 323 can also be called a light source adjuster. The operation and function of the LCD 300 will be illustrated in the following disclosure, and is thus omitted here.

[0013] Please refer to Fig.4, which is a flow chart of an operation of the LCD 300 shown in Fig.3. The flow chart includes the following steps. First, the ambient sensor 310 detects a variance of the outside luminance (step 400) and outputs a sensing signal according to the luminance of the environment to the scaler 320 (step 410). The backlight adjuster 323 of the scaler 320 adjusts the luminance of the backlight module 331 according to the sensing signal (step 420). As mentioned previously, the color mixed ratio of the RGB is followed the changing of the luminance of the backlight module 331. Therefore, the changed color portions should be adjusted back to the original γ =2.2 color portions.

[0014] In this embodiment, the look-up table 321 stores a plurality of gain setting adjustment policies. The gain controller 324, which is inside the scaler 320, selects a proper gain setting adjustment policy according to the adjusted luminance of the backlight module 331 (or according to the sensing signal outputted by the ambient sensor 310) to adjust the RGB color portions of the image. For example, the look-up table 321 can store a plurality of data, where each data corresponds to a relationship between the adjusted luminance of the backlight module 331 and the RGB gain values. This means the gain controller 324 can select a corresponding set of RGB gain values from the look-up table 321 according to the adjusted backlight module 331. The gain controller 324 then utilizes the selected RGB gain values to amplify the original image signal in order to generate an adjusted image signal (step 440). The LCD screen 330 then outputs the image according to the adjusted image signal (step 450).

[0015] Please note that the composite effect of the selected RGB gain values and the adjusted luminance of the backlight module 331 comply with the display effect of an γ =2.2 characteristic curve; in other words, the display effect of the adjusted image signal and the adjusted luminance of the backlight module 331 can comply with the γ =2.2 characteristic curve. Therefore, the present invention not only can adjust the luminance of the LCD screen 330, but will also have a good image outputting effect. The display image therefore does not have distortions due to the variances of the luminance of the LCD screen 330.

[0016] In addition, the establishment of the look-up table 321 can be easily accomplished by those skilled in the art. Before the LCD 300 is manufactured, various settings can be obtained through repeated experiments, and these settings can be stored inside the look-up table 321, therein to be used by the scaler 320. Please refer to Fig.5, which illustrates the determination method of the RGB gain values inside the look-up table. As mentioned previously, the variance of the luminance of the backlight module 331 influences the characteristic curve of the entire LCD 300. Assume that if the backlight module 331 is adjusted to be lighter, the characteristic curve will be shifted from γ =2.2 to γ =1.2. Therefore, an image signal originally corresponding to point A will change to correspond to a new point B due to the variance of the characteristic curve. Because the RGB color portions corresponding to point B do not comply with the γ =2.2 characteristic, the present invention directly utilizes the characteristic of point C. As shown in Fig.5, the luminance of point C is higher than that of point A, and point C furthermore lies in the γ=2.2 characteristic curve. Therefore, if the scaler 320 utilizes the RGB gain values corresponding to point C to process the original signal, the adjusted image signal not only can react to the luminance of the environment, but can also have the γ =2.2 image outputting effect.

[0017] In addition, in a preferred embodiment of the present invention, the designer can simply determine several levels of the backlight module luminance. For example, the outside luminance can be set as four levels in descending order of brightness, namely:

> light, dim light, dark, and very dark. The luminance of the backlight module 331 also needs to have four different adjustment levels, meaning the data stored in the look-up table will not be too large, and the storage device 322 does not need to have a big storage capacity. This can save on various costs of the LCD 300. Furthermore, the present invention does not limit the amount of data that can be stored in the look-up table 321, so, if cost is not an issue, the backlight module 331 can have more adjustment levels to make the LCD 300 capable of reacting more accurately.

[0018] Please note that, in the above-mentioned embodiment, the present invention reacts to outside luminance by adjusting the backlight module. However, the present invention can compensate the original image signal first, and then change the entire luminance of the LCD screen 330, wherein the compensated signal is adjusted according to data stored inside the look-up table 321. This also enables the LCD screen 330 to display an image having a good luminance and display effect.

[0019] Please refer to Fig.6, which is a functional block diagram of an LCD of an embodiment according to the present invention. As shown in Fig.6, the LCD 600 includes an ambient sensor 610, a scaler 620, and an LCD screen 630. The scaler 620 includes an image signal adjuster 623, a gain controller 624, and a storage device 622 for storing a look-up table 621. The connection of each device is shown in Fig.6. The scaler 620 is electrically connected to the ambient sensor 610. The gain controller 624 is electrically connected to the image signal adjuster 623 and the LCD screen 630. The operation and function of the LCD 600 will be illustrated in the following disclosure.

[0020] Please refer to Fig.7, which is a flow chart of an operation of an LCD 600 shown in Fig.6. It includes the following steps. First, the ambient sensor 610 detects a variance of the outside luminance (step 700) and outputs a sensing signal according to the luminance of the environment to the scaler 620 (step 710). In this embodiment, the image signal adjuster 623 of the scaler 620 directly compensates the original image. For example, if the outside luminance is stronger, the image signal adjuster 623 can directly add a difference Δ to each of the RG B values of the original image signal (step 720) to obtain a compensated image signal ($R+\Delta \cdot G+\Delta \cdot B+\Delta$). Obviously, the RGB color portions of the compensated image signal ($R+\Delta \cdot G+\Delta \cdot B+\Delta$) are different from the original RGB color portions. The gain controller 624 selects a corresponding RGB gain value from the look-up table 621 (step 730) to amplify the compensated image signal ($R+\Delta \cdot G+\Delta \cdot B+\Delta$) in order to generate an adjusted image signal (step 740). The LCD screen 630 then outputs an image

according to the adjusted image signal (step 750).

[0021] Please note that, in this embodiment, the adjusted image signal complies with the γ =2.2 characteristic curve, and the corresponding luminance of the adjusted image signal is higher than that of the original image signal. Therefore, the display image of the LCD screen 630 not only can react to outside luminance, but can also have the γ =2.2 image outputting effect. Furthermore, please note the establishment of the look-up table 621 is similar to that of the look-up table 321, and is thus omitted here.

[0022] It should be noted that the present invention does not limit the implementations of the ambient sensors 310 and 610. For example, the ambient sensors 310 and 610 can be implemented by light-sensing ICs, light-sensing diodes, light-sensing resistors, or by other light-sensing devices. These modifications also obey the spirit of the present invention.

[0023] Furthermore, the above-mentioned LCD is only utilized as a preferred embodiment, and not a limitation of the present invention. In other words, the present invention can be utilized in all kinds of displays, such as a plasma display or a projector. This also obeys the spirit of the present invention.

[0024] In addition, the above-mentioned adjusted image signal, the original image signal, and compensated signal are all RGB signals. Similarly, the RGB signals are utilized as an embodiment, not a limitation, and other types of image signals can also be utilized. This also obeys the spirit of the present invention.

[0025] In contrast to the prior art, the present invention display can react to the luminance of an environment and still have the γ =2.2 image outputting effect. Therefore, the present invention display does not influence the characteristic curve even if the luminance of the image changes. Even if the luminance of the display screen becomes lighter or darker, the details of the image will still have no distortions.

Claims

1. A display device (600) capable of compensating for luminance of an environment, the display device comprising:

   a sensor (610), for detecting a luminance of an environment to generate a sensing signal;
   an image outputting device (630), for outputting an image according to an adjusted image signal; and

   characterized by:

   a scaler (620), electrically connected to the sensor (610), and electrically connected to the image outputting device (630), for generating the adjusted image signal according to the sensing signal, the scaler (620) comprising:

   an image signal adjuster (623), for compensating for the luminance of the environment according to the sensing signal, and generating a compensated image signal; and
   a gain controller (624), electrically connected to the image signal adjuster (623), for adjusting a gain setting according to the sensing signal and utilizing the gain setting to amplify the compensated image signal to generate the adjusted image signal.

2. The display device (600) capable of compensating for luminance of an environment of claim 1, **characterized in that** the gain controller (624) adjusts the gain setting further according to a specific γ curve.

3. The display device (600) capable of compensating for luminance of an environment of claim 2, **characterized in that** a curvature of the specific γ curve is 2.2.

4. The display device (600) capable of compensating for luminance of an environment of claim 1, **characterized in that** the scaler (620) further comprises:

   a storage device (622), electrically connected to the scaler (620), for storing a look-up table (621), the look-up table (621) storing a plurality of gain setting adjustment policies;

   wherein the gain controller (624) selects a gain setting adjustment policy from the look-up table (621) according to the sensing signal in order to adjust the gain setting.

5. The display device (600) capable of compensating for luminance of an environment of claim 1, **characterized in that** the adjusted image signal and the compensated image signal are both composed of RGB signals.

6. A display device (300) capable of compensating for luminance of an environment, the display device (300) comprising:

   a display light source (331);
   a sensor (310), for sensing a luminance of an environment to generate a sensing signal corresponding to the luminance;
   an image outputting device (330), for outputting an image according to the adjusted image signal; and

   characterized by:

   a scaler (320), electrically connected to the sen-

sor (310), and electrically connected to the image outputting device (330), and electrically connected to the display light source (331), for processing an original image signal according to the sensing signal to generate an adjusted image signal, the scaler (320) comprising:

a light source adjuster (323), for adjusting the display light source (331) according to the sensing signal to compensate for the luminance;
a gain controller (324), for adjusting a gain setting according to the sensing signal and utilizing the gain setting to amplify the original image signal to generate the adjusted image signal.

7. The display device (300) capable of compensating for luminance of an environment of claim 6, **characterized in that** the gain controller (324) adjusts the gain setting further according to a specific r curve.

8. The display device (300) capable of compensating for luminance of an environment of claim 7, **characterized in that** a curvature of the specific γ curve is 2.2.

9. The display device (300) capable of compensating for luminance of an environment of claim 6, **characterized by**:

a storage device (322), electrically connected to the scaler (320), for storing a look-up table (321), the look-up table (321) storing a plurality of gain setting adjustment policies;

wherein the gain controller (324) selects a gain setting adjustment policy from the look-up table (321) according to the sensing signal in order to adjust the gain setting.

10. The display device (300) capable of compensating for luminance of an environment of claim 6, **characterized in that** the adjusted image signal and the compensated image signal are both composed of RGB signals.

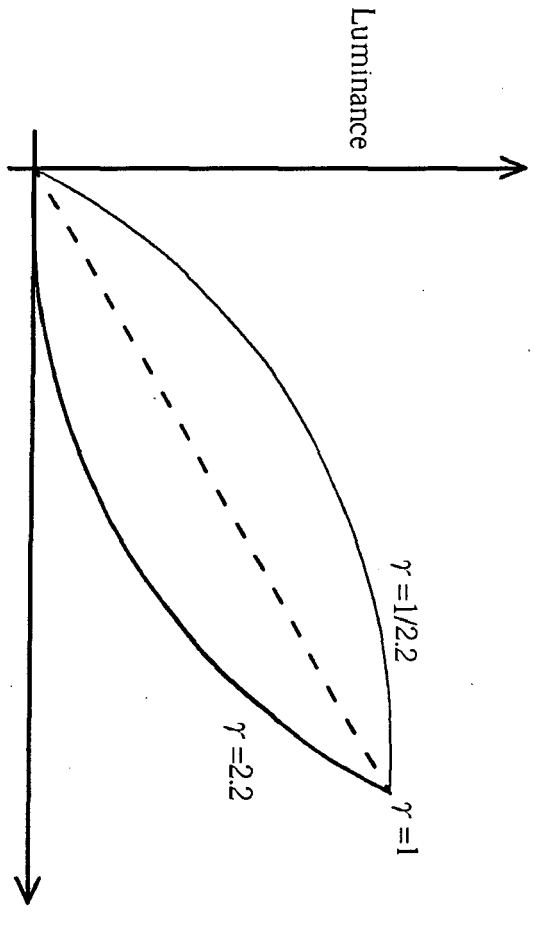

Fig. 1 Prior Art

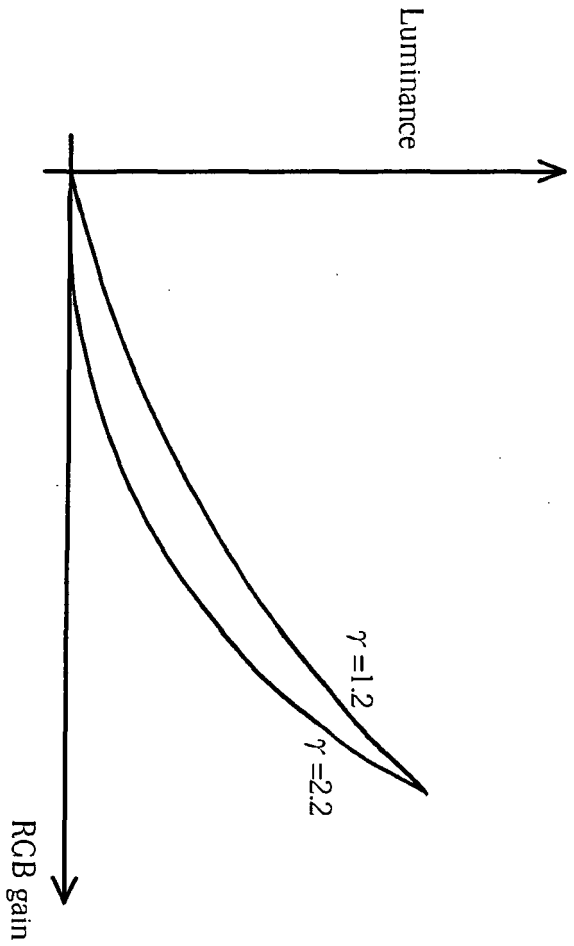

Fig. 2 Prior Art

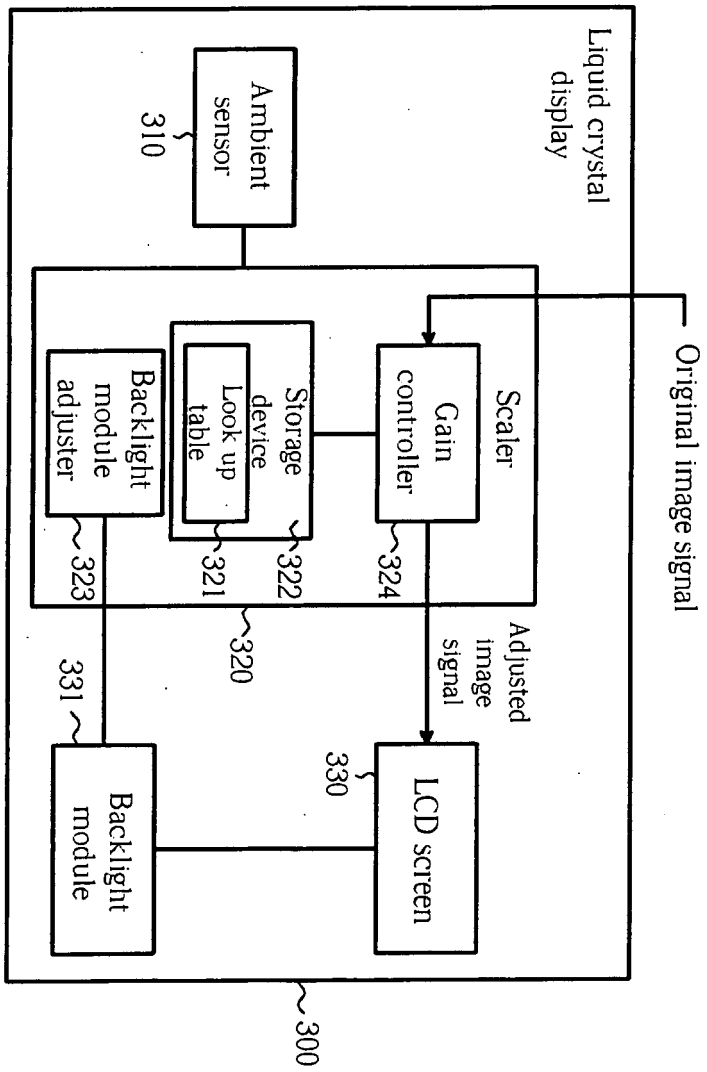
Liquid crystal display
Original image signal
Ambient sensor
310
Scaler
Gain controller
Storage device
Look up table
Backlight module adjuster
324
322
321
323
320
Adjusted image signal
331
330
Backlight module
LCD screen
300

Fig. 3

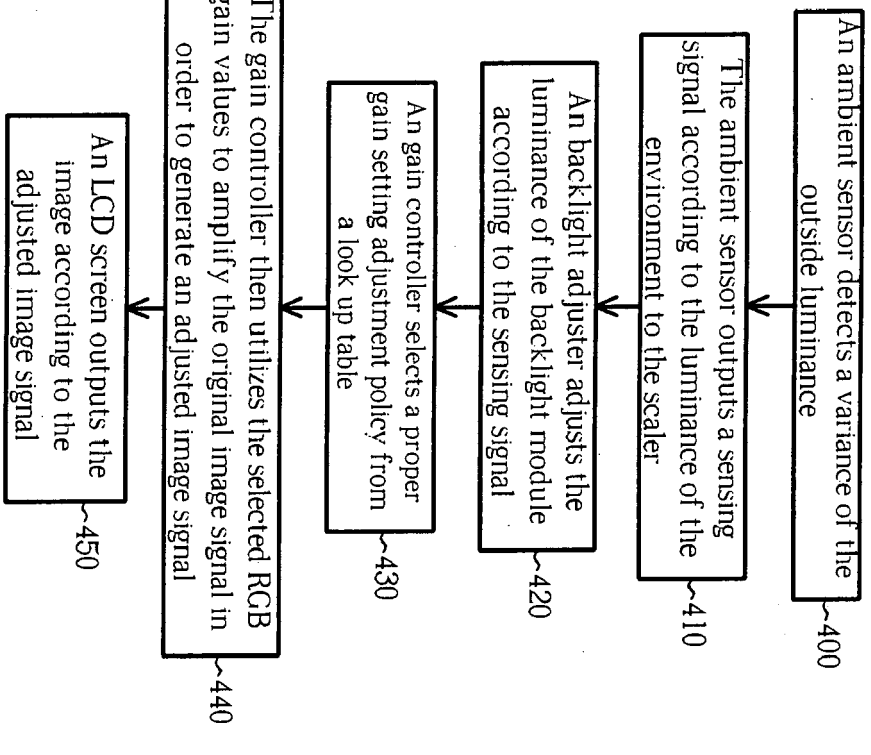
An ambient sensor detects a variance of the outside luminance
400
The ambient sensor outputs a sensing signal according to the luminance of the environment to the scaler
410
An backlight adjuster adjusts the luminance of the backlight module according to the sensing signal
420
An gain controller selects a proper gain setting adjustment policy from a look up table
430
The gain controller then utilizes the selected RGB gain values to amplify the original image signal in order to generate an adjusted image signal
440
An LCD screen outputs the image according to the adjusted image signal
450

Fig. 4

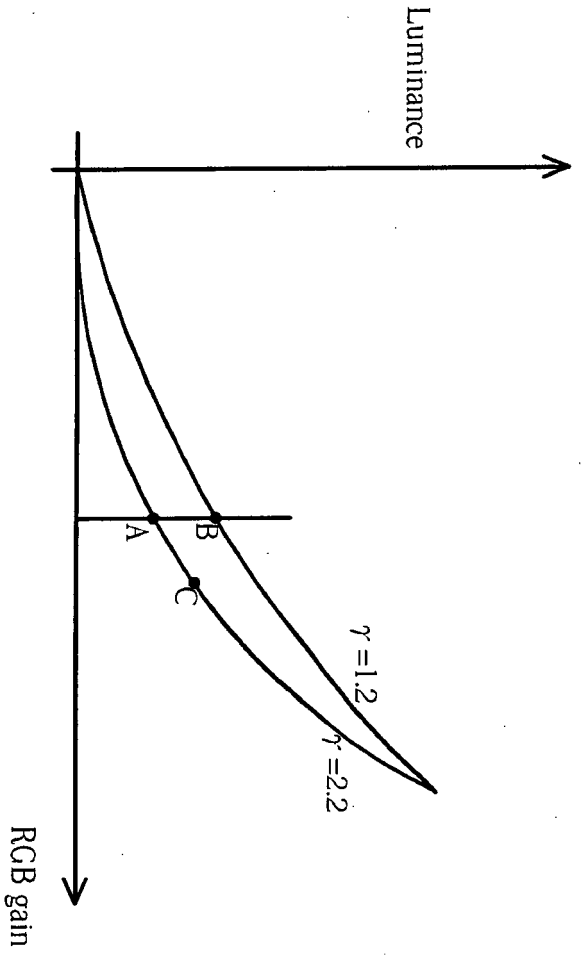

Fig. 5

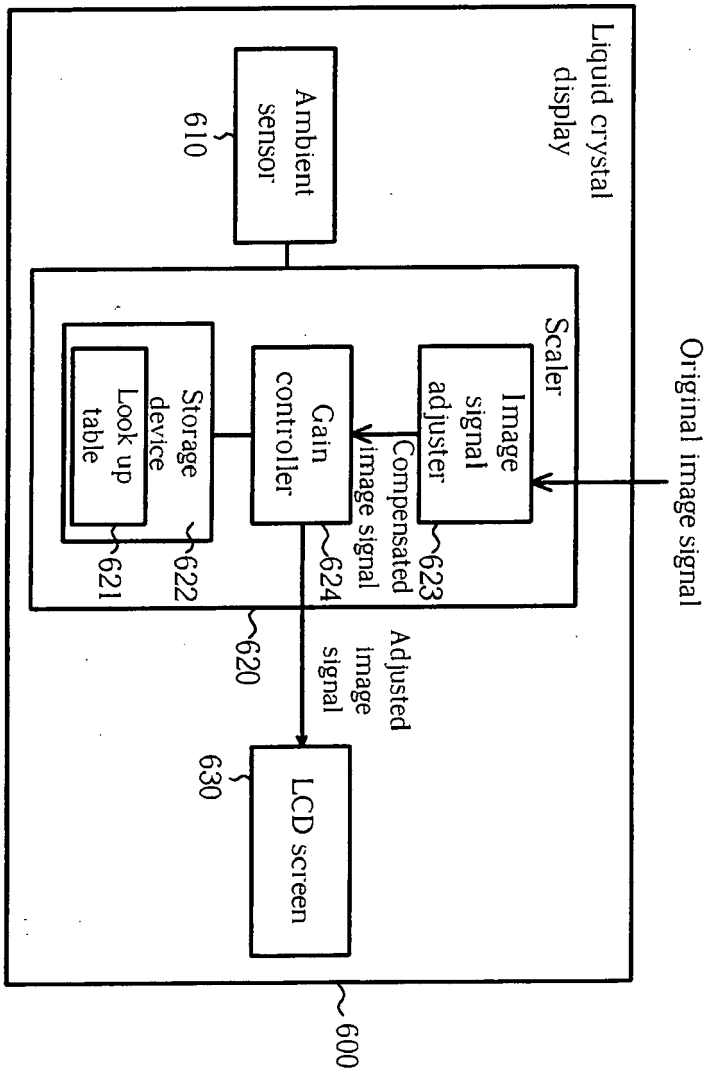
Liquid crystal display
Ambient sensor
610
Scaler
Image signal adjuster
Original image signal
Gain controller
Compensated image signal
623
624
Storage device
Look up table
622
621
620
Adjusted image signal
630
LCD screen
600

Fig. 6

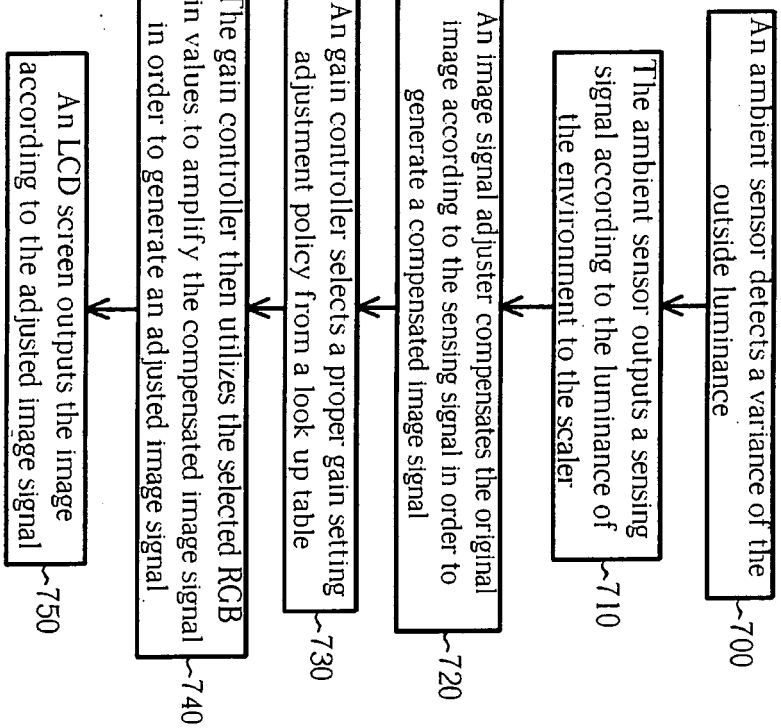
An ambient sensor detects a variance of the outside luminance
700
The ambient sensor outputs a sensing signal according to the luminance of the environment to the scaler
710
An image signal adjuster compensates the original image according to the sensing signal in order to generate a compensated image signal
720
An gain controller selects a proper gain setting adjustment policy from a look up table
730
The gain controller then utilizes the selected RGB gain values to amplify the compensated image signal in order to generate an adjusted image signal
740
An LCD screen outputs the image according to the adjusted image signal
750

Fig. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 00 8572

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 19, 5 June 2001 (2001-06-05) -& JP 2001 051652 A (SANYO ELECTRIC CO LTD), 23 February 2001 (2001-02-23)	1,2,5	INV. G09G3/34 G09G3/20
A	* abstract *	3,4	
Y	PATENT ABSTRACTS OF JAPAN vol. 018, no. 343 (P-1761), 28 June 1994 (1994-06-28) -& JP 06 083287 A (SHARP CORP), 25 March 1994 (1994-03-25)	1,2,5	
A	* abstract *	3,4	
Y	US 2004/036703 A1 (AOKI HIROSHI ET AL) 26 February 2004 (2004-02-26) * paragraphs [0014] - [0018]; figures 1,2 *	1,2,5	
X	US 2005/057484 A1 (DIEFENBAUGH PAUL S [US] ET AL) 17 March 2005 (2005-03-17)	6,7,9,10	TECHNICAL FIELDS SEARCHED (IPC)
A	* paragraphs [0027] - [0029]; figure 5 *	8	G09G
X	US 2004/104883 A1 (DRADER MARC A [CA]) 3 June 2004 (2004-06-03)	6,7,9,10	
A	* paragraphs [0019] - [0040]; figures 1,2 *	8	
X	EP 0 883 103 A (THOMSON MULTIMEDIA SA [FR]) 9 December 1998 (1998-12-09)	6,7,9,10	
A	* column 3, lines 1-58; figures 3,4 *	8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 January 2007	Harke, Michael

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

8

European Patent Office

Application Number
EP 06 00 8572

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 06 00 8572

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-5

The first invention concerns a display device capable of compensating for luminance of an environment, the display device comprising: a sensor, for detecting a luminance of an environment to generate a sensing signal; an image outputting device, for outputting an image according to an adjusted image signal; and a scaler, electrically connected to the sensor, and electrically connected to the image outputting device, for generating the adjusted image signal according to the sensing signal, the scaler comprising: a gain controller for adjusting a gain setting according to the sensing signal and utilizing the gain setting to amplify a compensated image signal to generate the adjusted image signal, wherein
the scaler comprises further an image signal adjuster, electrically connected to the gain controller, for compensating for the luminance of the environment according to the sensing signal, and generating the compensated image signal.

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2. claims: 6-10

The second invention concerns display device capable of compensating for luminance of an environment, the display device comprising:
a sensor, for sensing a luminance of an environment to generate a sensing signal corresponding to the luminance;
an image outputting device, for outputting an image according to the adjusted image signal; and
characterized by:
a scaler, electrically connected to the sensor, and electrically connected to the image outputting device, and electrically connected to the display light source, for processing an original image signal according to the sensing signal to generate an adjusted image signal, the scaler comprising:
a gain controller, for adjusting a gain setting according to the sensing signaland utilizing the gain setting to amplify the original image signal to generate the adjusted image signal,
wherein the display device comprises further
a display light source; and a light source adjuster, for adjusting the display light source according to the sensing signal to compensate for the luminance.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 00 8572

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