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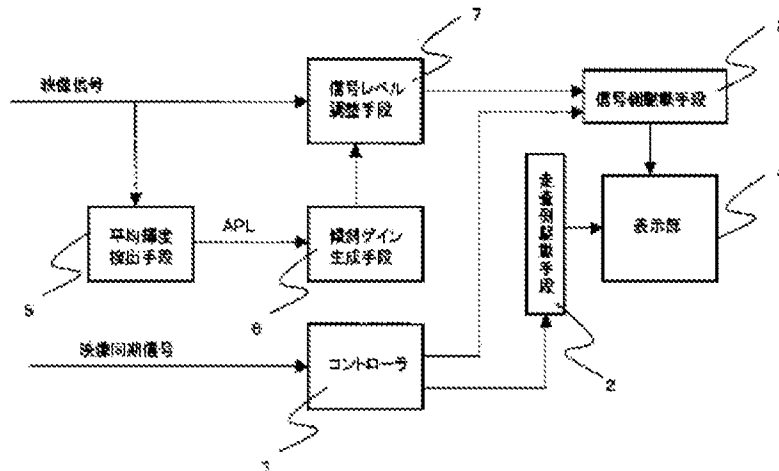
(54) Title of Invention: Display Device

(57) Abstract

Problem: To provide a display device wherewith, when performing an image display on a display unit configured by self-emitting devices, both low-power operation and display quality deterioration suppression are possible.

Means for Resolution: A display unit 4 is configured of a plurality of signal lines, a plurality of scanning lines, TFTs (thin-film transistors) provided for every pixel, and self-

emitting devices and the like. Average brightness detection means 5 detect the average brightness (APL [average picture level]) in a video signal. The APL is detected for either one screen or in multiple screen units. Gradient gain generation means 6 generate a gradient gain in correspondence with the APL. When the APL is high, the gradient gain is set large, and when the APL is low, the gradient gain is set small. Signal level adjustment means 7 lower the level of a video signal in correspondence with the gradient gain toward the periphery, centered on a prescribed position on the screen.



Patent Claims

Claim 1. A display device for displaying an input video signal on a display unit configured by auto-emitting devices; comprising:

- signal-side drive means for driving a plurality of signal lines in said display unit;
- scanning-side drive means for driving a plurality of scanning lines in said display unit;
- a controller for controlling said signal-side drive means and said scanning-side control means;

- average brightness detection means for detecting the average brightness level (APL) in said video signal;

- gradient gain generation means for outputting a signal gradient gain in correspondence with said APL; and

- signal level adjustment means for changing the signal level in correspondence with said signal gradient gain.

Claim 2. The display device according to claim 1, wherein: the gradient gain generation means set said signal gradient gain large when said APL is high, and set said signal gradient gain small when said APL is low; and the signal level adjustment means change the signal level so that it falls, toward the outside as centered on a prescribed position on the display screen, in correspondence with said signal gradient gain.

Claim 3. A display device for displaying an input video signal on a display unit configured by auto-emitting devices; comprising:

- average brightness detection means for detecting the average brightness level (APL) in said video signal;

- gradient gain generation means for making the signal gradient gain large when said APL is high, and making the signal gradient gain small when said APL is low;

- horizontal signal level adjustment means for changing the signal level in correspondence with said signal gradient gain;

- gate width adjustment means for changing the gate width that drives the scanning lines in the interior of the display in correspondence with said signal gradient gain;

- signal-side drive means for driving a plurality of signal lines in said display unit;

- scanning-side drive means for driving a plurality of scanning lines in said display unit;
- and

- a gate width correspondence controller for controlling said signal-side drive means and said scanning-side drive means in correspondence with the output of said gate width adjustment means.

Claim 4. The display device according to claim 3, wherein: the horizontal signal level adjustment means lower the signal level in correspondence with said signal gradient gain toward the left and right in the horizontal direction, centered on a prescribed position on the display screen; and the gate width adjustment means change the gate width that drives the scanning lines in the interior of the display, up and down in the vertical direction, centered of a prescribed position on the display screen, so that that gate width becomes shorter, in correspondence with said signal gradient gain.

Claim 5. A display device for displaying an input video signal on a display unit configured by auto-emitting devices; comprising:

horizontal-side drive means for driving a plurality of signal lines and device power supply voltage in said display unit;

scanning-side drive means for driving a plurality of scanning lines in said display unit; a controller for controlling said horizontal-side drive means and said scanning-side drive means;

average brightness detection means for detecting the average brightness level (APL) of said video signal;

gradient gain generation means for making the signal gradient gain large when said APL is high, and making the signal gradient gain small when said APL is low;

device power supply voltage adjustment means for changing the power supply voltage supplied to light emitting devices in the interior of the display in correspondence with said signal gradient gain; and

vertical signal level adjustment means for changing the signal level in correspondence with said signal gradient gain.

Claim 6. The display device according to claim 5, wherein: the device power supply voltage adjustment means lower the power supply voltage supplied to light emitting devices in the interior of the display, toward the left right in the horizontal direction, centered on a prescribed position on the display screen, in correspondence with said signal gradient gain; and said vertical signal level adjustment means lower the signal level up and down in the vertical direction, centered on a prescribed position on the display screen, in correspondence with said signal gradient gain.

Claim 7. A display device for displaying an input video signal on a display unit configured by auto-emitting devices; comprising:

average brightness detection means for detecting the average brightness level (APL) in said video signal;

gradient gain generation means for making the signal gradient gain large when said APL is high, and making the signal gradient gain small when said APL is low;

device power supply voltage adjustment means for changing the power supply voltage supplied to light emitting devices, toward the left and right in the horizontal direction, centered on a prescribed position on the display screen;

gate width adjustment means for shortening the gate width that drives the scanning lines in the interior of the display, up and down in the vertical direction, centered on a prescribed position on the display screen, in correspondence with said signal gradient gain;

horizontal-side drive means for driving a plurality of signal lines and device power supply voltage in said display unit;

scanning-side drive means for driving a plurality of scanning lines in said display unit; and

a gate width correspondence controller for controlling said horizontal-side drive means and said scanning-side drive means, in correspondence with the output of said gate width adjustment means.

Claim 8. A display device for displaying an input video signal on a display unit configured by auto-emitting devices; comprising:

signal-side drive means for driving a plurality of signal lines in said display unit;

scanning-side drive means for driving a plurality of scanning lines in the interior of said display unit;

a controller for controlling said signal-side drive means and said scanning-side drive means;

average brightness detection means for detecting the average brightness level (APL) in said video signal;

maximum brightness position detection means for detecting the maximum brightness position (MAXP) in said video signal;

gradient gain generation means for making the signal gradient gain large when said APL is high, and making the signal gradient gain small when said APL is low; and

signal level adjustment means for lowering the signal level toward the outside, centered on MAXP, in correspondence with said signal gradient gain.

Claim 9. A display device for displaying an input video signal on a display unit configured by auto-emitting devices; comprising:

average brightness detection means for detecting the average brightness level (APL) in said video signal;

gamma gain generation means for changing the signal gamma gain in correspondence with said APL;

gamma adjustment means for changing the signal gamma in correspondence with said signal gamma gain;

maximum signal detection means for detecting the maximum signal level output by said gamma adjustment means;

output stage voltage adjustment means for outputting a control value in correspondence with said maximum signal level;

signal-side drive means for changing the output stage power supply voltage in correspondence with the output of said output stage voltage adjustment means, and driving a plurality of signal lines in said display unit;

scanning-side drive means for driving a plurality of scanning lines in said display unit;

and
a controller for controlling said signal-side drive means and said scanning-side drive means.

Claim 10. The display device according to claim 9, wherein: the gamma gain generation means set the signal gamma gain small when said APL is high, and set the signal gamma gain large when said APL is low; and the output stage voltage adjustment means output a control value for changing the output stage power supply voltage of said signal-side drive means to the minimum necessary level in correspondence with up-and-down movements of said maximum signal level.

Claim 11. The display device according to any one of claims 1, 3, 5, 7, and 8, wherein the gradient gain generation means change the signal gradient gain either linearly or parabolically.

Claim 12. The display device according to any one of claims 1, 3, 5, 7, 8, and 9, wherein the display unit is configured of organic Electrodes, LEDs, electrical discharge tube(s), or electronic discharge device(s).

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