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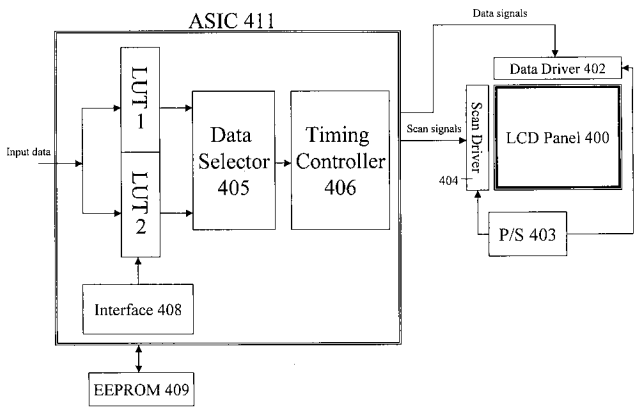
(54) Liquid crystal display driver for compensating viewing angle

(57) A system comprises a liquid crystal display viewable from front and side view points, and comprising a plurality of pixels having corresponding original luminance values, a plurality of data lines in the display, a plurality of data drivers for driving the data lines, and an adjusted gray scale generator for adjusting gray scales of the pixels and outputting two adjusted gray scales to the data drivers for driving the data lines at double the frequency. Original gray scales correspond to the original normalized luminance of front views and side views. For the adjusted gray scales stored in the look up table corresponding to the original gray scales, the sum of the absolute value of the difference between the adjusted normalized luminance values for the front and side views should be less than the sum of the absolute value of the difference between the original normalized luminance values for the front and side views in order to minimise color shifting between the front and side views.

FIG. 11



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EUROPEAN SEARCH REPORT

Application Number
EP 04 01 9705

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 June 2008	Morris, David

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
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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EUROPEAN SEARCH REPORT

Application Number
EP 04 01 9705

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 June 2008	Morris, David

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
O : non-written disclosure
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Application Number
EP 04 01 9705

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
P,A	US 2004/061711 A1 (KURUMISAWA TAKASHI [JP] ET AL) 1 April 2004 (2004-04-01) * paragraph [0046] - paragraph [0058]; figures 3,4a-5e *	9,10	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 June 2008	Morris, David

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X : particularly relevant if taken alone
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Application Number
EP 04 01 9705

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:

☐ The present supplementary 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 (Rule 164 (1) EPC).

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 04 01 9705

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: 1-8, 12-21

A display device and method for generating luminance values for a pixel element in which, during a single frame, a pixel is supplied in one subframe with a gradation value above the original gradation value, and in a second sub-frame with a level below an original gradation value in order to obtain an average value over the frame duration with improved viewing angle characteristics.
No mention is made of the construction of the pixels used in displaying the data generated.

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2. claims: 9-11

A display device in which two adajcent pixels on a row have the same colour, for displaying two adjusted signals.
No mention is made of the frequency at which the gradation data is displayed with respect to the input data, or the use of sub-frames.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 01 9705

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-06-2008

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	用于补偿视角的液晶显示驱动器		
公开(公告)号	EP1553553A3	公开(公告)日	2008-07-30
申请号	EP2004019705	申请日	2004-08-19
[标]申请(专利权)人(译)	群创光电股份有限公司		
申请(专利权)人(译)	奇美电子股份有限公司		
当前申请(专利权)人(译)	奇美群创光电		
发明人	HSU, YING-HAO C/O CHI MEI OPTOELECTRONICS CORP. SHIH, MING-CHIA C/O CHI MEI OPTOELECTRONICS CORP. LI, WANG-YANG C/O CHI MEI OPTOELECTRONICS CORP.		
IPC分类号	G09G3/36 G09G5/06 G09G3/20		
CPC分类号	G09G3/3607 G09G3/2022 G09G3/3685 G09G5/06 G09G2300/0447 G09G2300/0452 G09G2320/0276 G09G2320/028 G09G2320/0285		
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外部链接	Espacenet		

摘要(译)

一种系统，包括可从前视点和侧视点观看的液晶显示器，并包括具有相应原始亮度值的多个像素，显示器中的多个数据线，用于驱动数据线的多个数据驱动器，以及调整后的数据线灰度发生器，用于调整像素的灰度级，并将两个调整后的灰度级输出到数据驱动器，以便以两倍的频率驱动数据线。原始灰度对应于正视图和侧视图的原始标准化亮度。对于存储在对应于原始灰度等级的查找表中的调整后的灰度等级，前视图和侧视图的经调整的归一化亮度值之间的差的绝对值之和应小于绝对值的总和。前视图和侧视图的原始归一化亮度值之间的差异，以便最小化前视图和侧视图之间的色移。

FIG. 11