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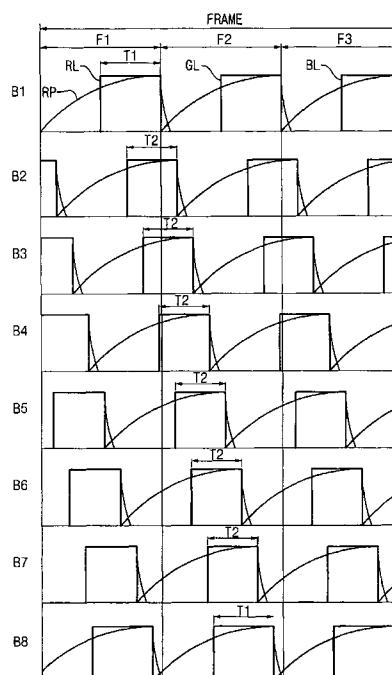
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(54) **Liquid crystal display apparatus**

(57) An LCD apparatus displays a color image of a frame divided into a plurality of periods in which different colors are displayed. The LCD apparatus includes an LCD panel (140) and a number of light-emitting units (152). The LCD panel includes a plurality of gate lines (GL) and a plurality of data lines (DL) crossing the plurality of the gate lines. The light-emitting units generate different colors in each of the periods such that an outermost light-emitting unit emits light longer than a second outermost light-emitting unit thereby enhancing luminance uniformity.

FIG. 3





EUROPEAN SEARCH REPORT

Application Number
EP 07 00 6153

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y A	US 2003/016205 A1 (KAWABATA MASAE [JP] ET AL) 23 January 2003 (2003-01-23) * paragraphs [0002], [0057] - [0078]; figures 1a-2b,3,7,8 *	1-5,7,9 6,8	INV. G09G3/34
Y	US 2004/246275 A1 (YOSHIHARA TOSHIKI [JP] ET AL) 9 December 2004 (2004-12-09) * paragraphs [0069] - [0082]; figures 11-15 *	1-5,7,9	
Y	WO 2005/111976 A (KONINKL PHILIPS ELECTRONICS NV [NL]; PHILIPS INTELLECTUAL PROPERTY [DE]) 24 November 2005 (2005-11-24) * page 7, lines 1-9 * * page 8, lines 7-16 * * page 16, lines 13-31; figures 1,7 *	1-5,7,9	
			TECHNICAL FIELDS SEARCHED (IPC)
			G09G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 17 June 2009	Examiner 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			

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Application Number

EP 07 00 6153

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due 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 those claims for which no payment was due.

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:
- 1-9
- ☐ 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).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

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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: 1-9

The first invention concerns a liquid crystal display apparatus displaying a color image of a frame by dividing the frame into a plurality of periods in which different colors are displayed, the LCD apparatus comprising: an LCD panel including a plurality of gate lines and a plurality of data lines crossing the plurality of gate lines; and a plurality of light-emitting units generating different colors in each of the periods such that outermost light-emitting units emits light longer than light-emitting units further from the outermost unit, wherein at least one pair of light-emitting units emit light longer than another pair of light-emitting units, wherein a first pair of light-emitting units emits light during a first time interval in each of the periods, a second pair of light-emitting units emit light during a second time interval that is shorter than the first time interval in each of the periods, wherein each of the light-emitting units includes a red light-emitting diode generating red light, a green light-emitting diode generating green light and a blue light-emitting diode generating blue light, wherein the frame is divided into three periods and the light-emitting unit sequentially generates the red light in a first period, the green light in a second period and the blue light in a third period, wherein the first time is in a range of about 2.4 ms to about 2.6 ms and the second time is in a range of about 2.1 ms to about 2.3 ms.

2. claims: 10-18

The second invention concerns a liquid crystal display apparatus displaying a color image of a frame by dividing the frame into a plurality of periods in which different colors are displayed, the LCD apparatus comprising: an LCD panel including a plurality of gate lines and a plurality of data lines crossing the plurality of gate lines; and a plurality of light-emitting units each of which include a number/a plurality of light emitting elements generating different colors in each of the periods, light-emitting units closer to the edge of the panel including more light-emitting elements than more centrally located light-emitting units / wherein the separation distance between a first light-emitting unit located outermost and a second light-emitting unit is shorter than the separation distance between the second light-emitting unit and a third light-emitting unit located more remotely from the edge of the LCD panel.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 00 6153

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
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17-06-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003016205 A1	23-01-2003	CN 1399158 A	26-02-2003
		JP 3850241 B2	29-11-2006
		JP 2003029236 A	29-01-2003
		KR 20030009190 A	29-01-2003
		TW 574680 B	01-02-2004

US 2004246275 A1	09-12-2004	JP 2004233555 A	19-08-2004
		KR 20040069958 A	06-08-2004

WO 2005111976 A	24-11-2005	CN 1954354 A	25-04-2007
		JP 2007537477 T	20-12-2007
		US 2008259020 A1	23-10-2008

专利名称(译)	液晶显示装置		
公开(公告)号	EP1843319A3	公开(公告)日	2009-10-14
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[标]申请(专利权)人(译)	三星电子株式会社		
申请(专利权)人(译)	SAMSUNG ELECTRONICS CO. , LTD.		
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代理机构(译)	DR.威猛和合作伙伴		
优先权	1020060031365 2006-04-06 KR		
其他公开文献	EP1843319A2		
外部链接	Espacenet		

摘要(译)

LCD装置显示被分成显示不同颜色的多个时段的帧的彩色图像。LCD装置包括LCD面板 (140) 和多个发光单元 (152)。LCD面板包括多条栅极线 (GL) 和与多条栅极线交叉的多条数据线 (DL)。发光单元在每个周期中产生不同的颜色,使得最外面的发光单元比第二最外面的发光单元发光更长,从而提高亮度均匀性。

FIG. 3

