



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**07.01.1999 Bulletin 1999/01**

(51) Int. Cl.<sup>6</sup>: **G09G 3/36, G09G 3/20**

(43) Date of publication A2:  
**15.04.1998 Bulletin 1998/16**

(21) Application number: **97117385.1**

(22) Date of filing: **08.10.1997**

(84) Designated Contracting States:  
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE**  
Designated Extension States:  
**AL LT LV RO SI**

(30) Priority: **09.10.1996 JP 268381/96**  
**09.09.1997 JP 243988/97**

(71) Applicant:  
**CANON KABUSHIKI KAISHA**  
**Tokyo (JP)**

(72) Inventors:  
• **Tsuroyama, Akira**  
**Ohta-ku, Tokyo (JP)**

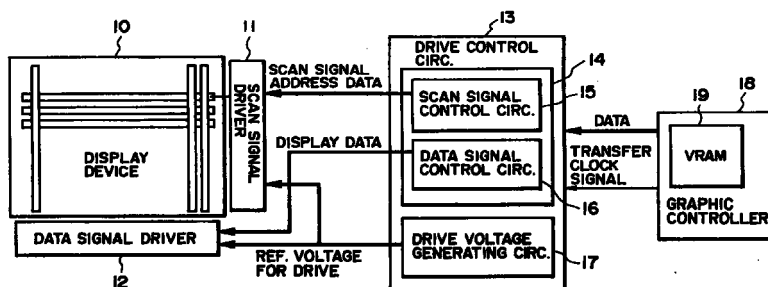
- **Mizutani, Hidemasa**  
**Ohta-ku, Tokyo (JP)**
- **Takahashi, Masanori**  
**Ohta-ku, Tokyo (JP)**
- **Ohshima, Masamichi**  
**Ohta-ku, Tokyo (JP)**
- **Aratani, Shuntaro**  
**Ohta-ku, Tokyo (JP)**
- **Ouchi, Toshimichi**  
**Ohta-ku, Tokyo (JP)**

(74) Representative:  
**Pellmann, Hans-Bernd, Dipl.-Ing. et al**  
**Patentanwaltsbüro**  
**Tiedtke-Bühling-Kinne & Partner**  
**Bavariaring 4**  
**80336 München (DE)**

(54) **Display device using sub-pixels and driving method therefor**

(57) A display device includes a plurality of scanning electrodes and a plurality of data electrodes so as to form a multiplicity of pixels each comprising a plurality of sub-pixels having mutually different areas for displaying a plurality of gradation levels by application of an electric signal corresponding to given gradation data to each pixel. The display device is driven by applying a scanning selection signal to a plurality of scanning electrodes corresponding to at least two sub-pixels having

an identical area of adjacent two pixels in an identical selection period. A display device may be formed such that each pixel includes at least one sub-pixel corresponding to a first electrode and at least one other sub-pixel corresponding to a second electrode, wherein said first and second electrodes have their respective terminals which are disposed at one and the other of two mutually opposite edges of the display device.



**FIG. 3**



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 97 11 7385

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 673 012 A (CANON INFORMATION SYSTEMS RESEARCH AUSTRALIA PTY LTD.) 20 September 1995 * Abstract * * page 3, line 11 - page 5, line 8; figures 1-5,7; table A *	1-10	G09G3/36 G09G3/20
A	EP 0 703 561 A (CANON K.K.) 27 March 1996 * Abstract * * column 2, line 16 - line 45; figures 1-4 * * column 4, line 20 - column 8, line 50 *	1,5-8,10	
A	EP 0 685 832 A (SHARP K.K.) 6 December 1995 * Abstract * * page 2, line 10 - line 23; figures 1,5,12-14 * * page 6, line 37 - line 41 * * page 9, line 28 - page 11, line 7 *	1,6-8,10	
X	EP 0 453 033 A (N.V. PHILIPS GLOEILAMPENFABRIEKEN B.V.) 23 October 1991 * Abstract * * column 5, line 4 - line 26; figures 2,4 *	11-14	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Y		15-17	G09G
X	EP 0 471 460 A (I.B.M. CO.) 19 February 1992 * Abstract * * column 2, line 17 - column 3, line 7; figures 1,3 *	11,13	
-/--			
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>29 October 1998</b>	Examiner <b>Corsi, F</b>
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 (P4/C01)



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 97 11 7385

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	TSUGUJI TACHIUCHI ET AL.: "A Color LCD Controller" IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, vol. ce-33, no. 3, August 1987, pages 359-365, XP002082590 * page 363, left-hand column, paragraph 2.3 - page 365, left-hand column, line 11; figures 8,9 *	15,16	
Y	EP 0 717 390 A (CANON K.K.) 19 June 1996 * Abstract * * column 3, line 35 - column 5, line 10; figures 2,10 * * column 9, line 54 - column 10, line 17 * -----	17	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>29 October 1998</b>	Examiner <b>Corsi, F</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 ..... &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03 82 (P04C01)