

EXHIBIT F

(12) **United States Patent**
Shin

(10) **Patent No.:** US 6,804,724 B2
 (45) **Date of Patent:** *Oct. 12, 2004

(54) **ANALOG/DIGITAL DISPLAY ADAPTER AND A COMPUTER SYSTEM HAVING THE SAME**

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(75) **Inventor:** Seung-Gi Shin, Suwon (KR)

FOREIGN PATENT DOCUMENTS

EP 0 419 910 A2 4/1991
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(73) **Assignee:** Samsung Electronics Co., Ltd., Suwon-si (KR)

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(*) **Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

The User Manual for the Gateway Solo 5300 notebook computer, pp. 5 and 20.
 Printout of www.ati.com/products/mobilityradeon/display.html from ATI technologies, Inc.

(List continued on next page.)

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) **Appl. No.:** 09/301,609

(57) **ABSTRACT**

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A desktop computer system has a display adapter capable of supporting a digital display such as LCD panels as well as an analog display. The computer system provides analog/digital video signals outputted from the display adapter with a CRT monitor or a LCD monitor depending upon the monitor cable connection state. The computer system further has a power saving function to be performed in the display adapter also depending upon the monitor cable connection state. The display adapter includes two video ports, that is, a first video port being coupled with the CRT monitor cable, and a second video port being coupled with the digital monitor cable. Further included is a digital transmitter for sending parallel digital video signals to the LCD monitor through the second video port. A monitor cable sensing circuit is provided to detect connection state of the digital monitor cable. To this end, the digital monitor generates a signal being sent to the second video port over the monitor cable, thereby informing the video controller of the monitor cable connection state. If the LCD monitor cable is not connected with the video port, the sensing circuit prevents the display enable (DE) signal supplied by the video controller from being inputted to the transmitter.

(65) **Prior Publication Data**

US 2002/0149541 A1 Oct. 17, 2002

(30) **Foreign Application Priority Data**

Apr. 29, 1998 (KR) 98-15395
 Oct. 16, 1998 (KR) 98-43766

(51) **Int. Cl.⁷** **G06F 13/00**

(52) **U.S. Cl.** **710/2; 345/3; 345/147**

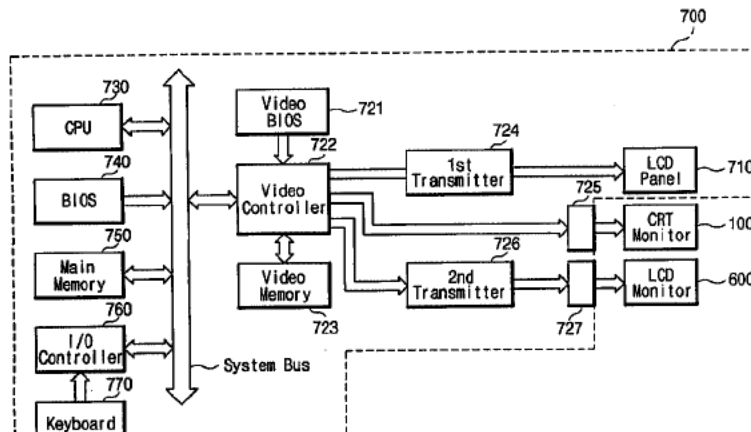
(58) **Field of Search** 345/147, 3, 22, 345/186, 89, 1, 553, 132, 127, 30, 211-213; 710/2

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14 Claims, 19 Drawing Sheets



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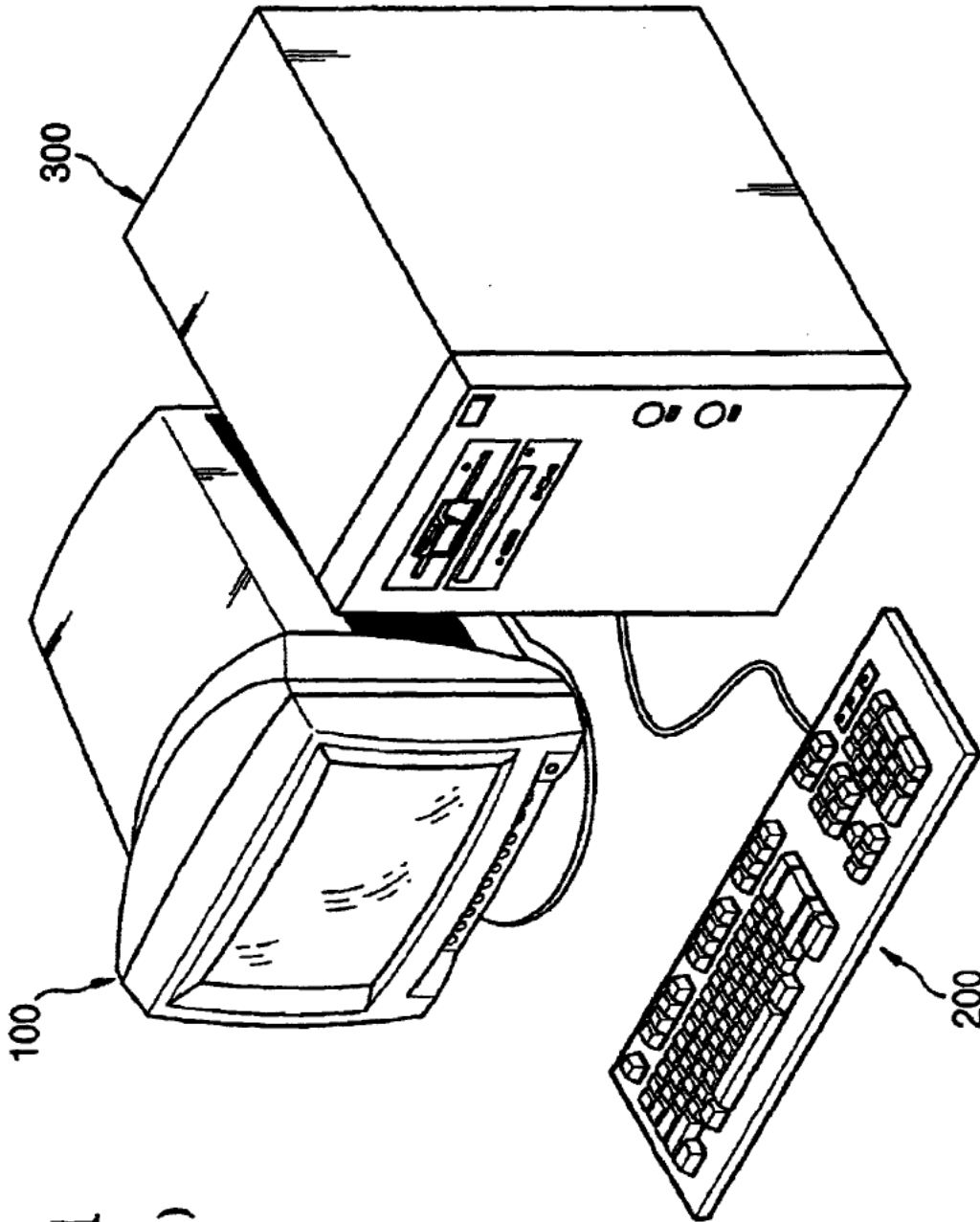


Fig. 1
(Prior art)

Fig. 2

(Prior art)

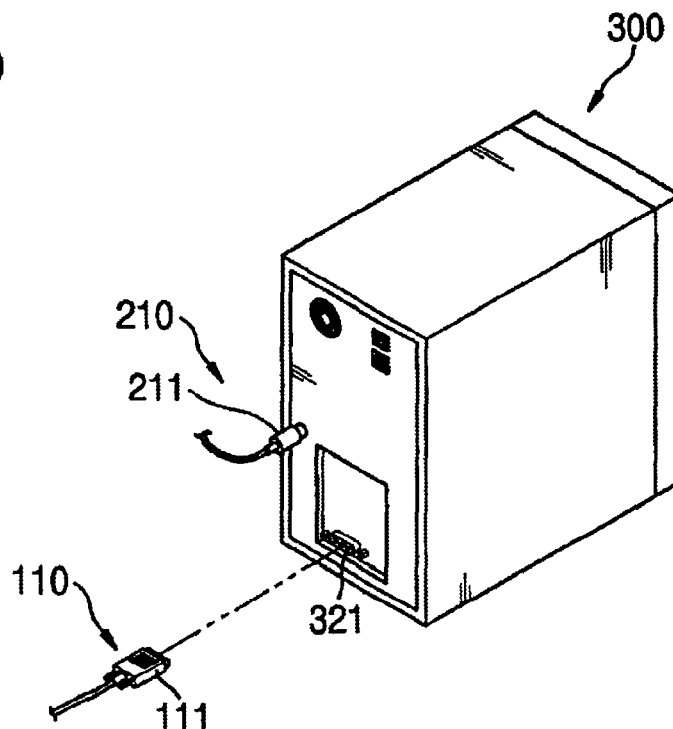
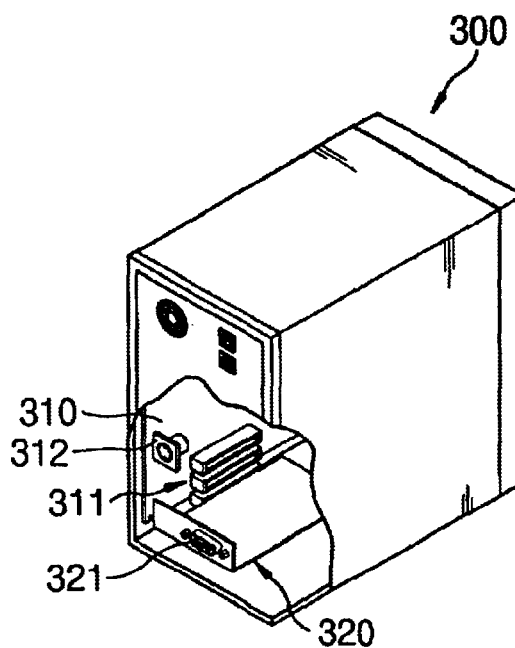


Fig. 3

(Prior art)



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