

[54] **METHOD AND APPARATUS FOR EXPANDING GRAPHICS IMAGES FOR LCD PANELS**

[75] Inventors: **Sridhar Kotha**, Fremont; **Vlad Bril**, Campbell; **Alexander J. Eglit**, Half Moon Bay; **Robin Sungsoo Han**, Saratoga, all of Calif.

[73] Assignee: **Cirrus Logic, Inc.**, Fremont, Calif.

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[51] **Int. Cl.**<sup>7</sup> ..... **G09G 3/36**

[52] **U.S. Cl.** ..... **345/132; 345/127; 345/213**

[58] **Field of Search** ..... **345/3, 132, 133, 345/213, 127, 87; 348/581**

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*Primary Examiner*—Steven J. Saras

*Assistant Examiner*—John G. Lim

*Attorney, Agent, or Firm*—Robert P. Bell; Kile McIntyre Harbin & Lee

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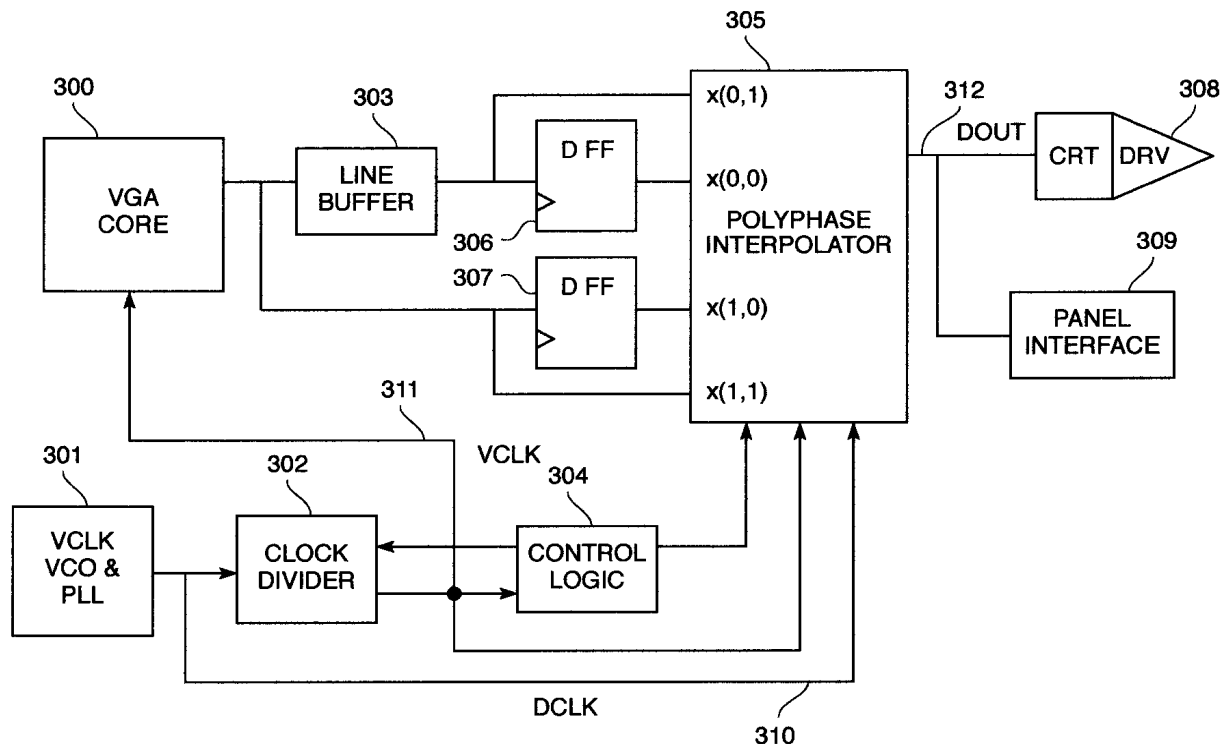
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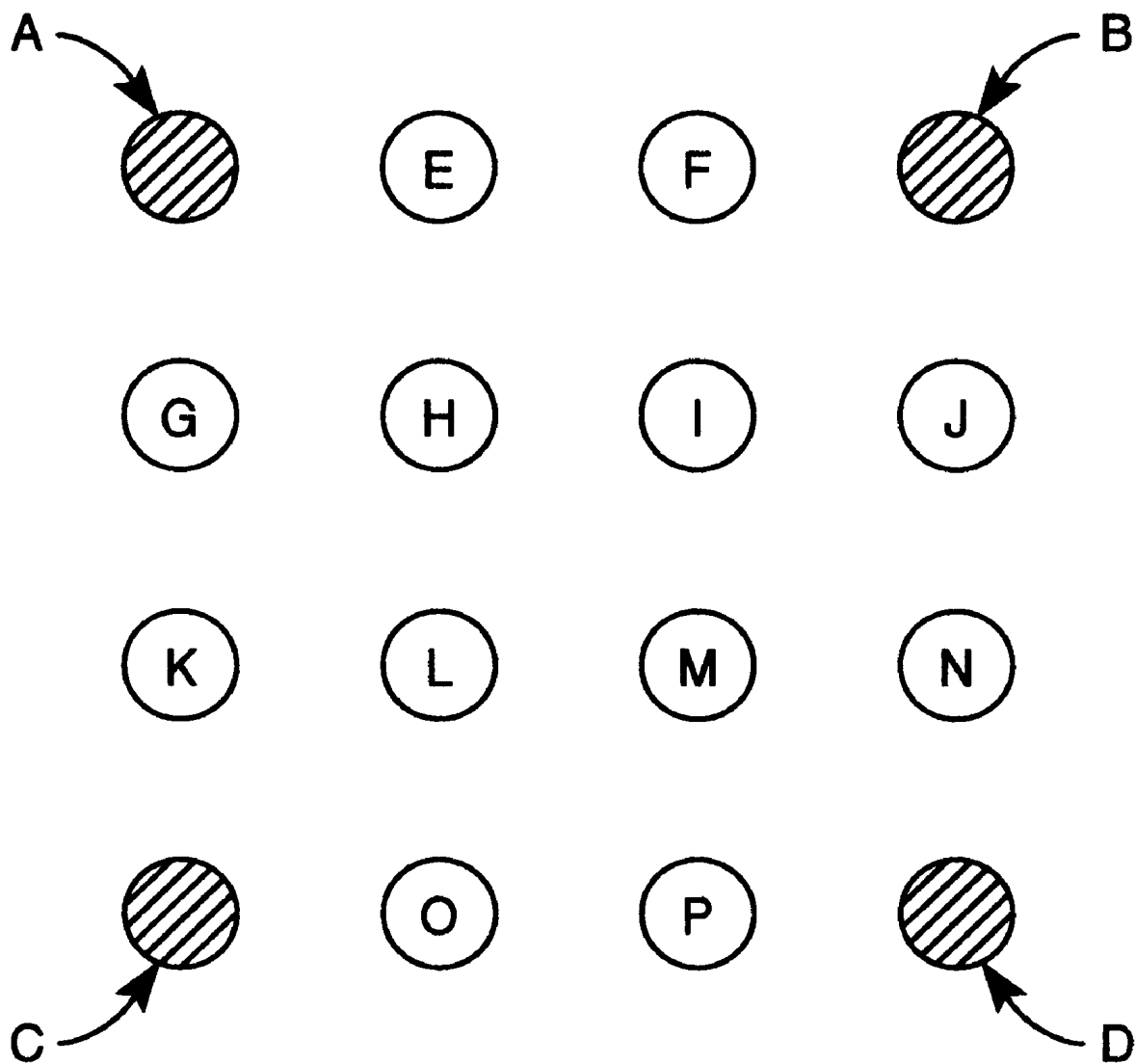
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[57] **ABSTRACT**

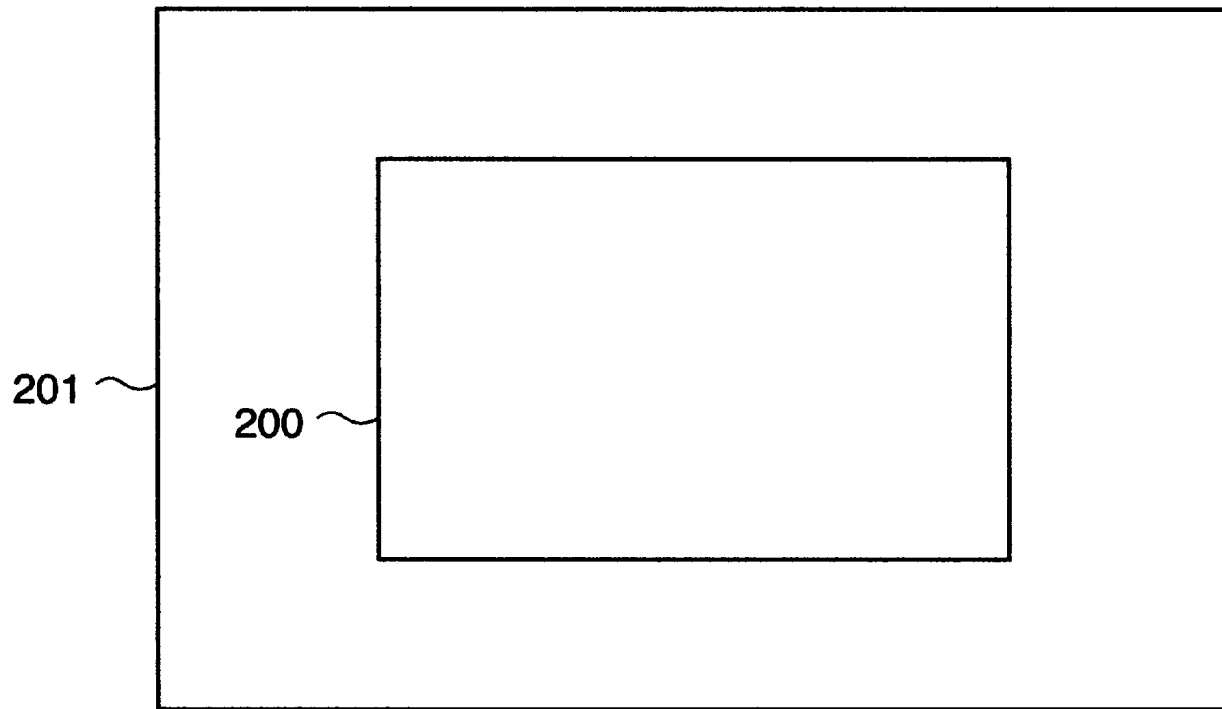
A display controller in a computer system controls the output of graphics display data in a computer system having a fixed resolution flat panel display. Fixed panel displays may have problems displaying non-native resolutions particularly at lower resolutions. The controller of the present invention uses a Discrete Time Oscillator (DTO) based clock divider and DCT based polyphase interpolation to upscale graphics display data from a first resolution to the panel resolution. DTO clock divider circuit synchronizes scan clocks between the input resolution and the desired output resolution. Within graphics display area, MVA™ display at greater color depth and resolution may be accommodated by additional DTO divider and interpolation steps.

**11 Claims, 5 Drawing Sheets**





**Figure 1**



**Figure 2  
(Prior Art)**

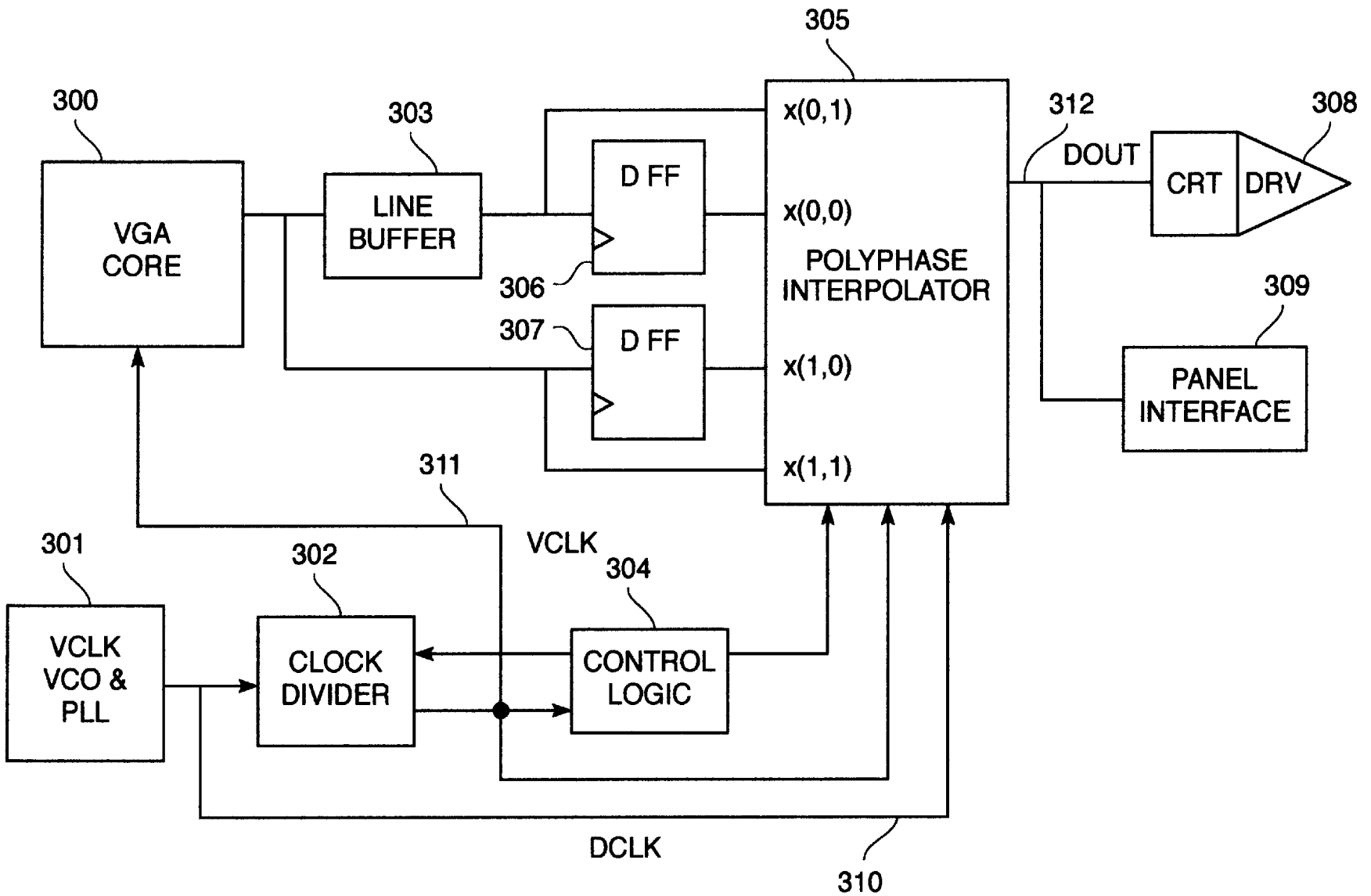


Figure 3

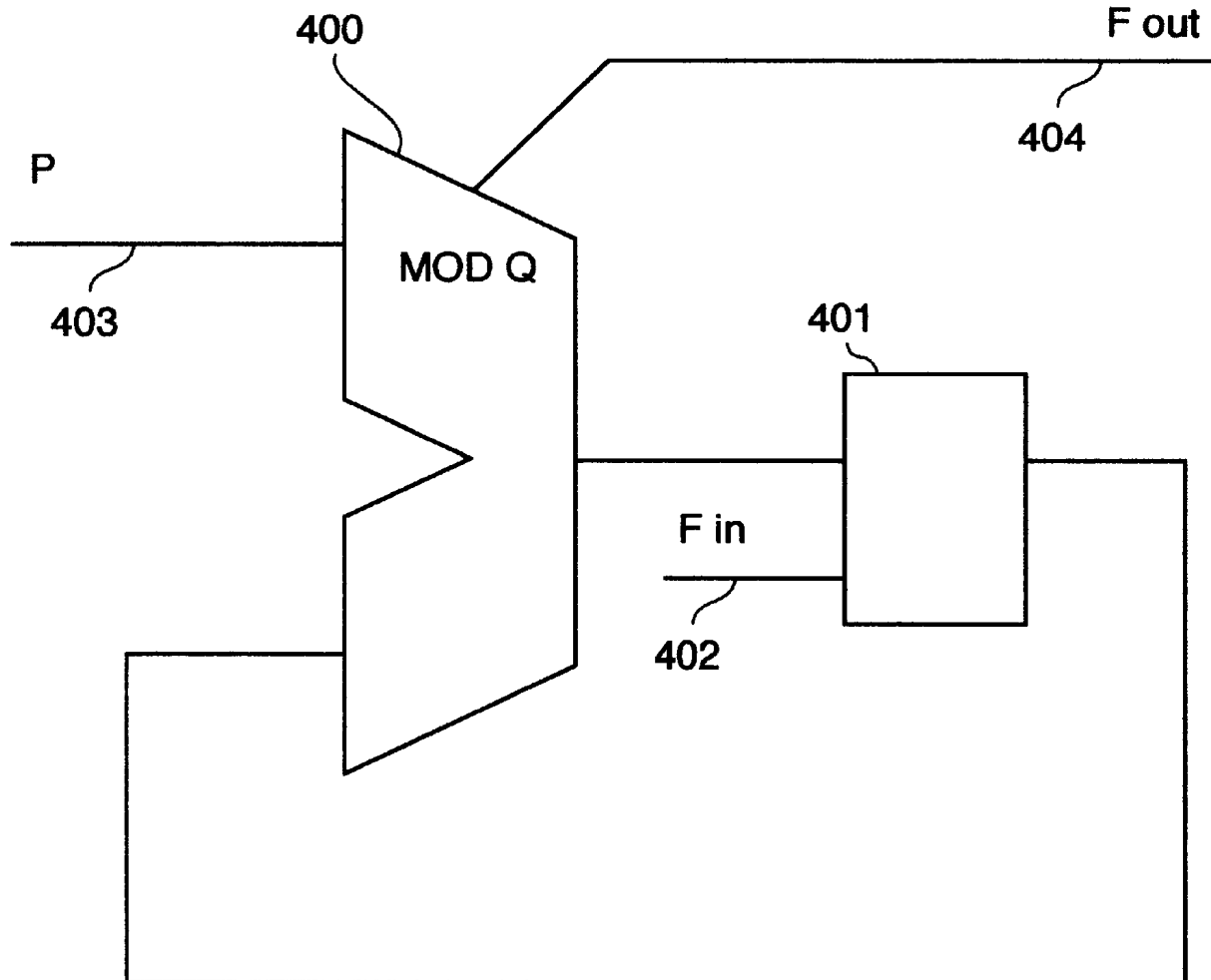


Figure 4

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