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42383/89

FORM 1

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A STANDARD PATENT

Kabushiki Kaisha Toshiba, of 72 Horikawa-cho, Saiwai-ku, Kawasaki-shi,
Kanagawa-ken, JAPAN, hereby apply for the grant of a standard patent for an
invention entitled:

Window Display Control Device

which is described in the accompanying complete specification.

Details of basic application(s):-

<u>Basic Applic. No:</u>	<u>Country:</u>	<u>Application Date:</u>
63-242510	JP	29 September 1988

The address for service is:-

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DATED this TWENTY EIGHTH day of SEPTEMBER 1989

Kabushiki Kaisha Toshiba

By:



Registered Patent Attorney

TO: THE COMMISSIONER OF PATENTS
OUR REF: 108699
S&F CODE: 58460

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APPLICATION ACCEPTED AND AMENDMENTS
ALLOWED.....5-12-90

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

In support of the Convention Application made for a patent for an invention entitled:

Window Display Control Device

I/~~We~~, Kensuke Norichika.....
[full name of declarant(s)]

care
of KABUSHIKI KAISHA TOSHIBA.....
[full address of declarant(s) - not post office box]

..... 72 Horikawa-cho, Saiwai-ku, Kawasaki-shi, Kanagawa-ken,

..... Japan.....

do solemnly and sincerely declare as follows:-

1. I am/~~We are~~ authorised by Kabushiki Kaisha Toshiba, the applicant for the patent to make this declaration on its behalf.

2. The basic application as defined by Section 141 of the Act was made in Japan on 29 September 1988 by Kabushiki Kaisha Toshiba.

3. Naoki Fujii, of 708-11 Yokokawa-cho, Hachioji-shi, Tokyo, Japan, is the actual inventor of the invention and the facts upon which the applicant is entitled to make the application are as follows:

Kabushiki Kaisha Toshiba is entitled by Contract of Employment between the inventor as employee and Kabushiki Kaisha Toshiba as employer, as a person who would be entitled to have the patent assigned to it if a patent were granted upon an application made by the inventor.

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

DECLARED at Tokyo this 1st day of December 1989

Kensuke Norichika
Signature of Declarant

Kensuke NORICHIKA
General Manager of the
Intellectual Property Division

TO: THE COMMISSIONER OF PATENTS
AUSTRALIA

JED/3717D

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(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 607638

(54) Title
WINDOW DISPLAY CONTROL DEVICE

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(56) Prior Art Documents
EP 52755
EP 249696
EP 280502

(57) Claim

1. A window display control device for retrieving and displaying display data in a virtual window region designated in an output data from an external device, comprising:

(a) a buffer memory for storing the output data from the external device;

(b) data process means for converting the output data stored in the buffer memory into display data;

(c) a virtual image plane memory for storing display data converted by the data process means;

(d) window control means for separately distinguishing and retrieving only display data localized in the designated virtual window region from the storage means in accordance with a display start signal;

(e) a view port memory for storing display data retrieved by the window control means and to be displayed on an image plane; and

(f) window display acceleration means for preferentially feeding only a portion of the output data which are located in the virtual window region for the output data to the data process means, in accordance with

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(10) 607638

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positional information given by the window control means which indicates a position of the virtual window region for the output data, immediately feeding the display start signal to the window control means upon completion of feeding of said portion of the output data, and thereafter feeding a remaining portion of the output data which are located outside of the window region for the output data to the data process means.

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FORM 10

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PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE:

Class Int Class

Complete Specification Lodged:
Accepted:
Published:

Priority:

Related Art:

This document contains the amendments made under Section 49 and is correct for printing.

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Complete Specification for the invention entitled:

Window Display Control Device

The following statement is a full description of this invention, including the best method of performing it known to me/us

ABSTRACT OF THE DISCLOSURE

There is disclosed a window display control device for display of a window image on a CRT image plane or the like.

- 5 This device enables high speed data display in a window region on renewal of the image plane thereof, also enables preferential data display in the window region without waiting renewal of the entire body of an output data text thereof.



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TITLE OF THE INVENTION

WINDOW DISPLAY CONTROL DEVICE

5 BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a window display control device which is used for displaying of window picture
10 images on a CRT image plane or the like, and particularly to a window display control device which enables high speed data display in a window region on renewal of the image plane.

15 Description of the Prior Art

Fig. 1 is a block diagram to schematically show construction of a conventional window display control device.

As shown in the same diagram, a window display control
20 device 1 comprises a buffer memory 2, data process means 3, an imaginary image plane memory 4, window control means 5 and a view port memory 6.

In the buffer memory 2, an output data text from a data process device is contained. The data process means 3
25 converts the output data text contained in the buffer memory 2 into display data.

In the imaginary image plane memory 4, the display data converted by the data process means 3 are contained. The window control means 5 retrieves only display data in a
30 window region 4a separately designated in the imaginary image plane memory 4 in accordance with a predetermined display start command.

In the view port memory 6, the display data retrieved by the window control mean 5 are contained. The data
35 contained in the view port memory 6 are displayed in a CRT image plane 7.

As started above, only the display data contained in the window region 4a of those contained in the imaginary image plane memory 4 are displayed in the CRT image plane 7, and when the window region 4a is suitably moved, a window image displayed on the CRT image plane also moves.

However, in such a conventional window display control device, when the display data in the imaginary image plane memory 4 are renewed, the window control means 5 is arranged so as not to retrieve data in the window region 4a until all of the renewal of the renewal data supplied from the data process means 3 is completed. Accordingly, as shown in Fig. 2, when an amount of output data 8 localized in the window region 4a is small as compared with a size of the entire body of an output data text 9, since the output data 8 are actually displayed on a screen after a renewal process of all the data text is completed, the display speed of the data 8 becomes very low even though the amount thereof is small.

This problem becomes remarkable as the amount of the output data localized in the window region 4a is small as compared with the size of the entire body of the output data text 9.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a window display control device which enables high speed data display in a window region on renewal of an image plane.

Another object of the present invention is to provide a window display control device which can preferentially display only display data in the window region without waiting renewal of the entire body of an output data text.

~~In order to achieve the above objects, a feature of the present invention resides in a window display control device comprising a buffer memory for containing an output~~



In accordance with the present invention there is disclosed a window display control device for retrieving and displaying display data in a virtual window region designated in an output data from an external device, comprising:

(a) a buffer memory for storing the output data from the external device;

(b) data process means for converting the output data stored in the buffer memory into display data;

(c) a virtual image plane memory for storing display data converted by the data process means;

(d) window control means for separately distinguishing and retrieving only display data localized in the designated virtual window region from the storage means in accordance with a display start signal;

(e) a view port memory for storing display data retrieved by the window control means and to be displayed on an image plane; and

(f) window display acceleration means for preferentially feeding only a portion of the output data which are located in the virtual window region for the output data to the data process means, in accordance with positional information given by the window control means which indicates a position of the virtual window region for the output data, immediately feeding the display start signal to the window control means upon completion of feeding of said portion of the output data, and thereafter feeding a remaining portion of the output data which are located outside of the window region for the output data to the data process means.

According to the construction as said above, the window acceleration means preferentially feeds the output data text localized in the window region to the data process means, gives a display start command to the window control means immediately after completion of the feed of all the output data text located in the window region, thus only the display data localized in the window region can be preferentially fed to the view port memory without waiting renewal of data without the window region in the imaginary image plane memory. As the result, there can be realized high speed display of a window picture image on the renewal of the image plane.

These and other objects, features and advantages of the present invention will be more apparent from the following description of a preferred embodiment, taken in conjunction with the accompanying drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram to show construction of a conventional window display control device;

5 Fig. 2 is a schematical diagram to show an enlarged view of an imaginary image plane memory shown in fig. 1;

Fig. 3 is a block diagram of an embodiment of a window display control device according to the present invention; and

10 Fig. 4 is a block diagram to show an example of specific construction of the window display control device shown in Fig. 3.

DETAILED DESCRIPTION OF THE EMBODIMENT

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Fig. 3 is a block diagram to schematically show an embodiment of a window display control device relating to the present invention.

In the same diagram, reference numerals 20 respectively designating compositional parts in the conventional example of Fig. 1 are used, thus explanations on them are omitted.

As shown in Fig. 3, it is a feature of this window display control device 1a that window display acceleration means 10 is provided between a buffer memory 2 and data process means 3, and window control means 5a having novel construction.

Namely, the window control means 5a is so arranged as to inform to the window display acceleration means 10 a positional information I_1 (x, y coordinate positions and lengths of x axis and y axis) to show what portion of an imaginary image plane memory 4 is preferentially in a window region 4a.

The window acceleration means 10 checks an output data 35 text contained in the buffer memory 2, and retrieves output

data to be located in the window region 4a and commanded from the window control means 5a preferentially or selectively, then the window acceleration means 10 delivers the output data D in the window region 4a to the data process means 3.

Subsequently, the data process means 3 converts the data D delivered from the window display acceleration means 10 into display data, then delivers them into the imaginary image plane memory 4.

At the time, since the data D to be located in the window region 4a are preferentially delivered, the data storing on the window region 4a is carried out preferentially in the imaginary image plane memory 4.

When the above delivery of the output data in the window region 4a is completed, the window display means 10 immediately gives a display start command I_2 to the window control means 5a. Then, the window control means 5a retrieves the display data in the window region 4a of the imaginary image plane memory 4, and delivers the data into a view port memory 6. As the result, an image in the window region 4a is immediately displayed on a CRT image plane 7 without waiting completion of renewal of all of the imaginary image plane memory 4, thus an apparent display renewal speed is improved.

Thereafter, the window display acceleration means 10 delivers output data text out of the window region 4a to the data process means 3 in the same manner as conventional ones.

Accordingly, in the imaginary image plane memory 4, storing of display data out of the window region 4a is carried out later after the storing of the display data in the window region 4a.

As the result, the storing of the display data out of the window region 4a is carried out later than that of the conventional ones, however, since the display data out of

the window region 4a are not displayed on the CRT image plane 7 at this time, thus no problems to the window image display are recognized.

5 As stated above, according to the window display control device of the embodiment, when the imaginary image plane to be a background of the window image is renewed, since the display data in the window region 4a are preferentially renewed and immediately displayed on the image plane, the apparent window image renewal display
10 speed becomes higher than that of conventional ones.

It is possible to provide various concrete construction of the window display control device as shown in Fig. 3. For example, a construction as shown in Fig. 4 is a general one thereof. The construction mainly
15 comprises CPU 11 for obtaining the functions of the above window display acceleration means, data process means and window control means, and ROM 12 for containing programs to carry out processes of the window acceleration means, data process means and window control means in the CPU 11.

20 As is apparently seen from the above description, according to the present invention, there can be realized high speed window image display on renewal of the imaginary image plane in a window display control device of this kind.

25 Various modifications will become possible for those skilled in the art after receiving the teachings of the present disclosure without departing from the scope thereof.

The claims defining the invention are as follows:

1. A window display control device for retrieving and displaying display data in a virtual window region designated in an output data from an external device, comprising:

(a) a buffer memory for storing the output data from the external device;

(b) data process means for converting the output data stored in the buffer memory into display data;

(c) a virtual image plane memory for storing display data converted by the data process means;

(d) window control means for separately distinguishing and retrieving only display data localized in the designated virtual window region from the storage means in accordance with a display start signal;

(e) a view port memory for storing display data retrieved by the window control means and to be displayed on an image plane; and

(f) window display acceleration means for preferentially feeding only a portion of the output data which are located in the virtual window region for the output data to the data process means, in accordance with positional information given by the window control means which indicates a position of the virtual window region for the output data, immediately feeding the display start signal to the window control means upon completion of feeding of said portion of the output data, and thereafter feeding a remaining portion of the output data which are located outside of the window region for the output data to the data process means.

2. A window display control device, substantially as described herein with reference to Figs. 3 and 4 of the drawings.

DATED this TWENTY-SEVENTH day of NOVEMBER 1990

Kabushiki Kaisha Toshiba

Patent Attorneys for the Applicant
SPRUSON & FERGUSON

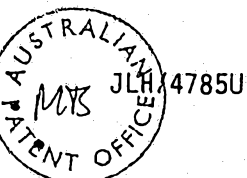


FIG. 1

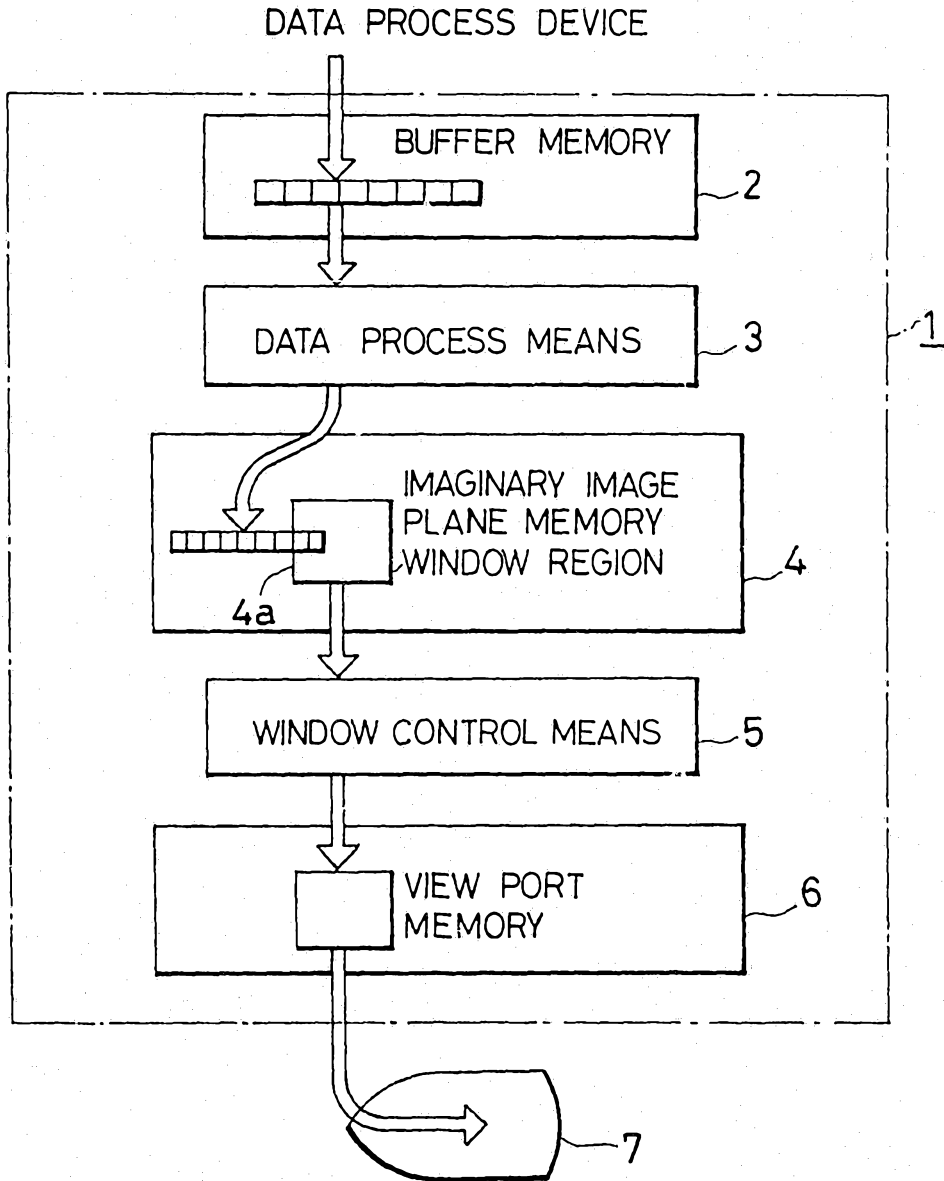


FIG.2

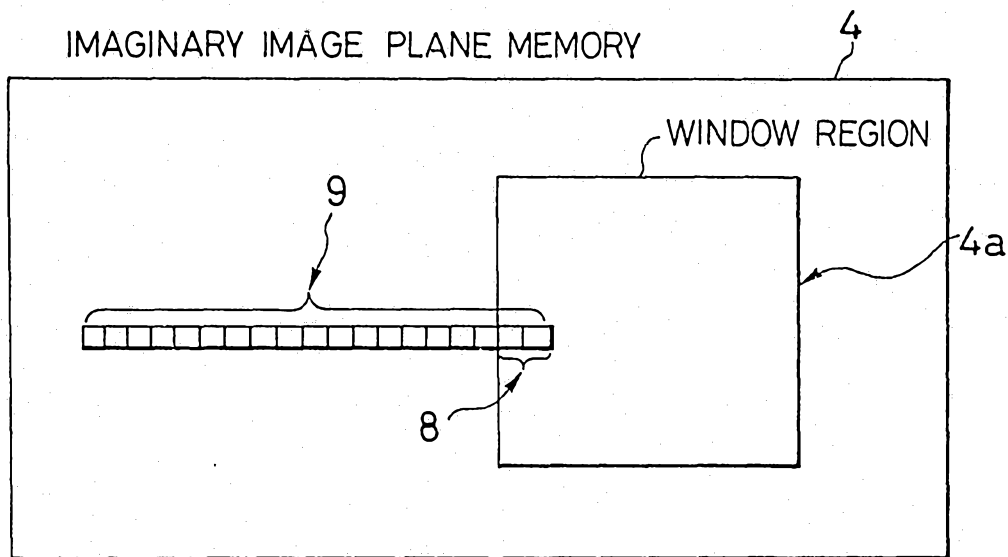


FIG.4

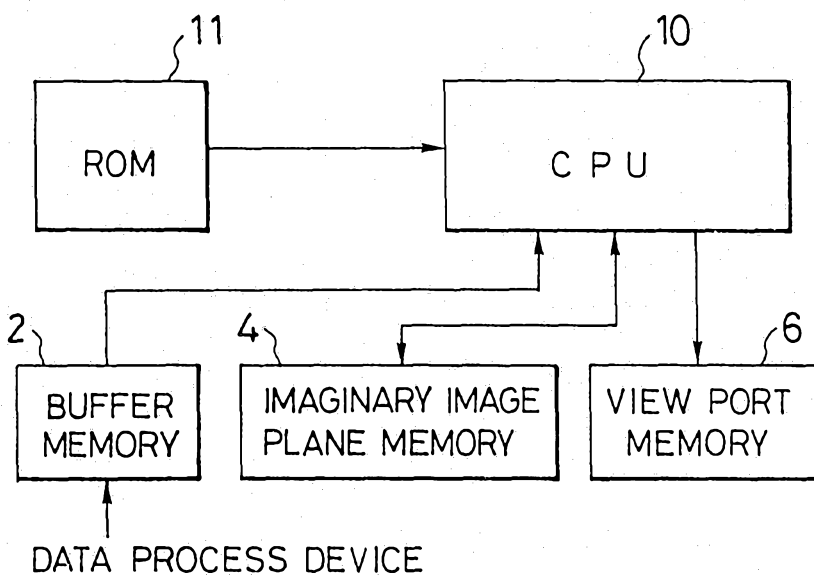


FIG. 3

