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Kaneko et al.

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[54] **IMAGE PROCESSING APPARATUS WHICH CAN UPDATE PROGRAM**

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**[6] **G06F 9/44**; G06F 9/445; G06F 19/00

[52] **U.S. Cl.** **395/712**; 399/77; 399/83

[58] **Field of Search** 395/162–166, 395/700, 501, 507, 712; 358/296, 443, 444, 448; 355/203, 204, 209, 314; 360/99.02, 99.06; 345/203, 201

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[57] **ABSTRACT**

An image processing apparatus comprises: an inserting unit to insert a memory medium such as IC card or floppy disc which can be freely attached or detached and in which programs to control the image processing apparatus have been stored; a memory to store the program which has been read out from the memory medium and kind data indicative of the kind of program; a loading circuit to load the program stored in the memory medium into the memory; and a control unit to control the image processing apparatus in accordance with the program stored in the memory. In the case where the program has already been stored in the memory, the control unit controls the loading circuit in a manner such that when the kind data stored in the memory is the data indicative of a special program, the loading of the program from the memory medium to the memory is inhibited and, when the kind data stored in the memory is not the data indicative of the special program, the loading of the program from the memory medium to the memory is executed.

8 Claims, 6 Drawing Sheets

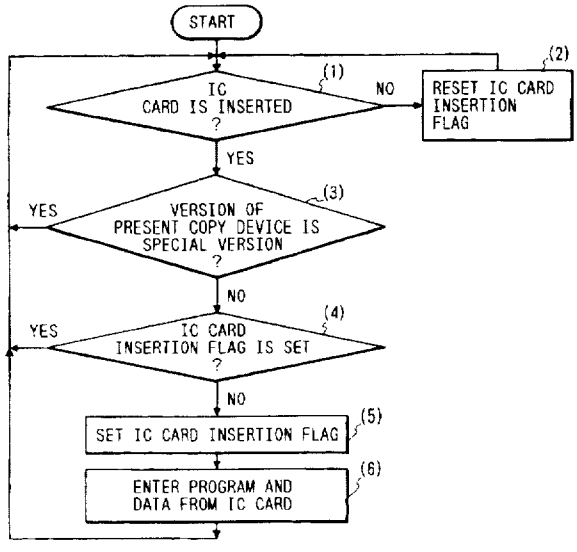

FIG. 1

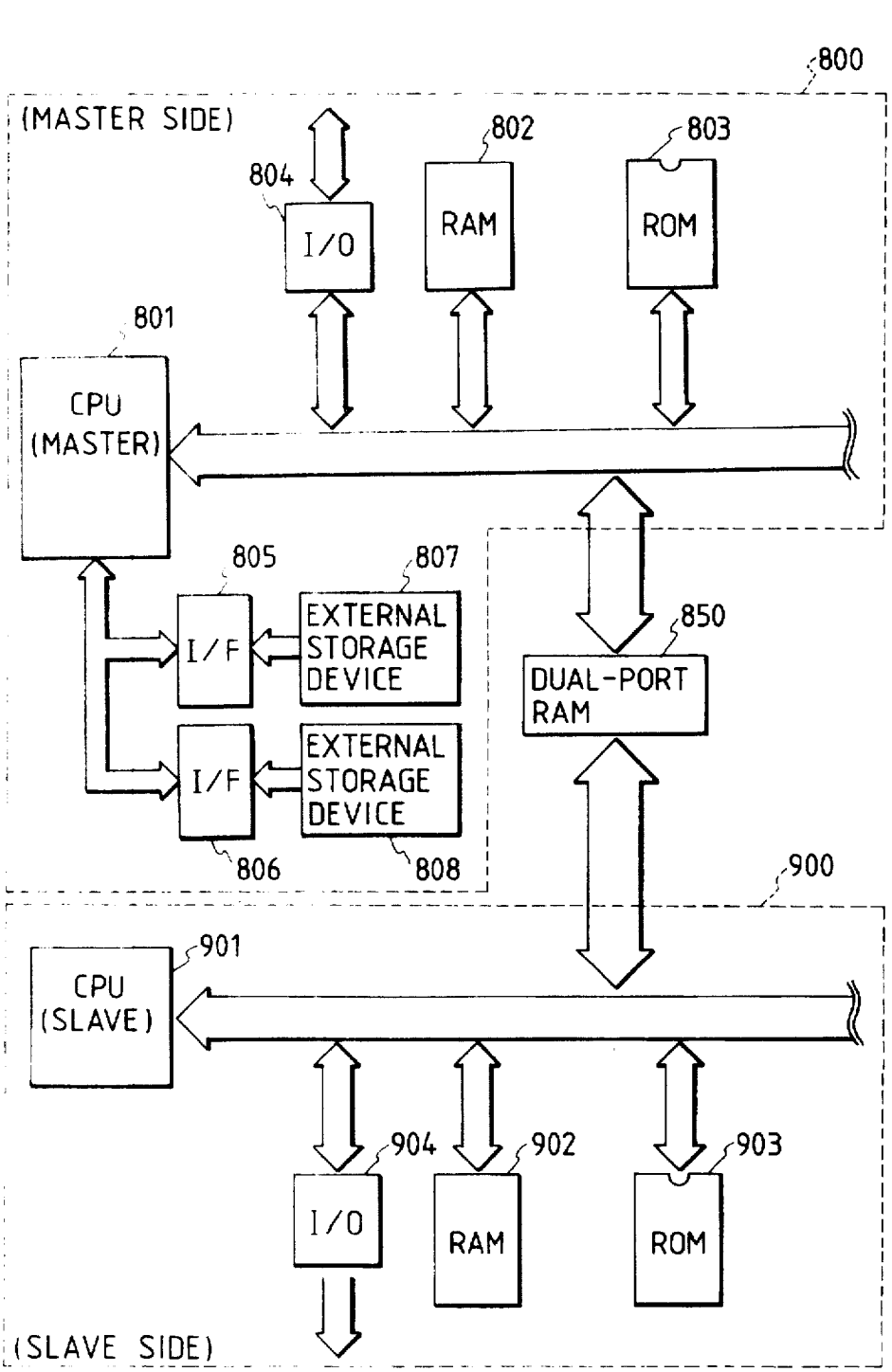
100
800
(MASTER SIDE)
804
I/O
802
RAM
803
ROM
801
CPU
(MASTER)
805
807
I/F
EXTERNAL
STORAGE
DEVICE
850
DUAL-PORT
RAM
I/F
EXTERNAL
STORAGE
DEVICE
806
808
900
901
CPU
(SLAVE)
904
902
903
I/O
RAM
ROM
(SLAVE SIDE)

FIG. 2

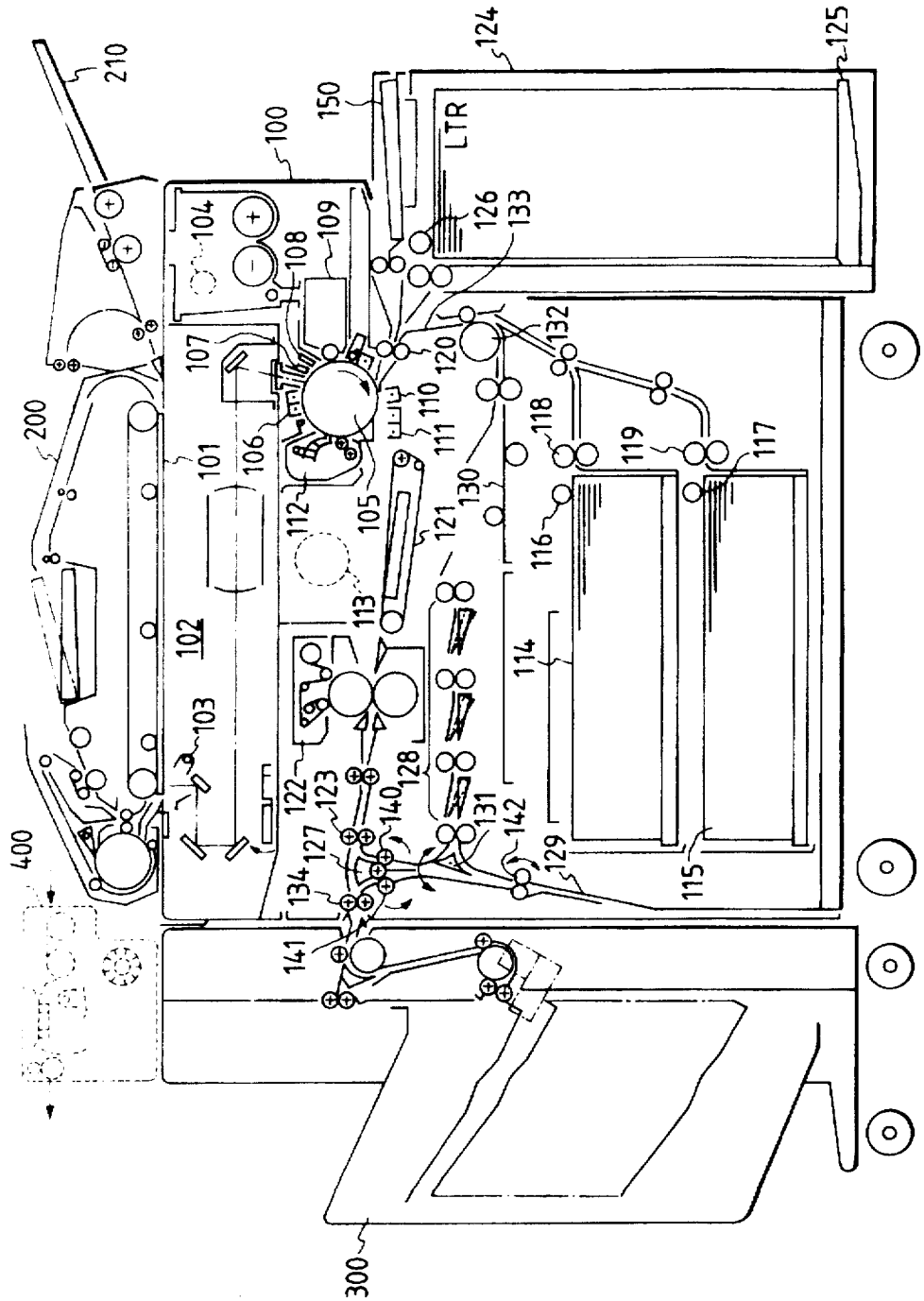
210
100
150
124
125
LTR
104
108
109
126
133
107
120
132
200
101
106
110
111
118
119
117
112
105
121
130
116
102
113
114
103
122
123
128
131
142
129
115
400
127
140
134
141
300

FIG. 3

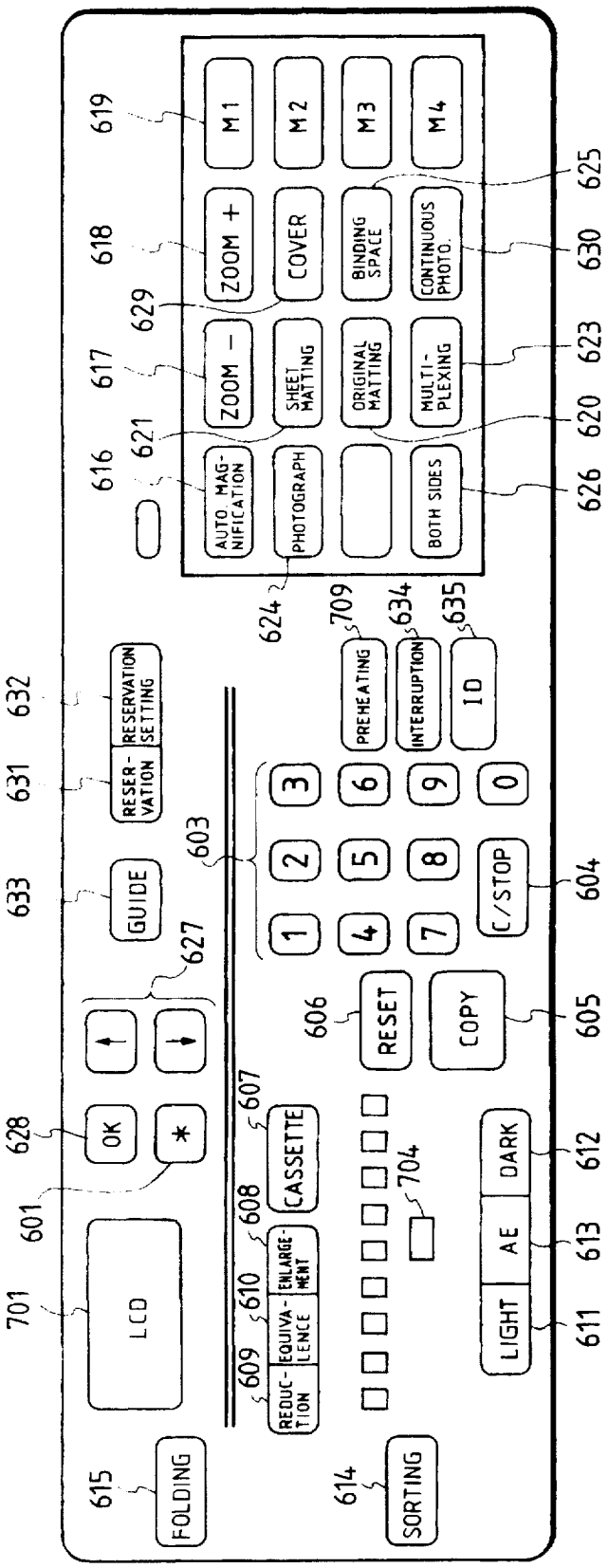
600
LCD
FOLDING
SORTING
OK
*
GUIDE
RESERVATION
RESERVATION SETTING
CASSETTE
REDUCTION
EQUIVALENCE
ENLARGEMENT
RESET
COPY
C/STOP
LIGHT
AE
DARK
1
2
3
4
5
6
7
8
9
0
PREHEATING
INTERRUPTION
ID
AUTO MAGNIFICATION
PHOTOGRAPH
ZOOM −
SHEET MATTING
ZOOM +
COVER
ORIGINAL MATTING
MULTI-PLEXING
BINDING SPACE
CONTINUOUS PHOTO.
BOTH SIDES
M1
M2
M3
M4
601
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
623
624
625
626
627
628
629
630
631
632
633
634
635
701
704
709

FIG. 4

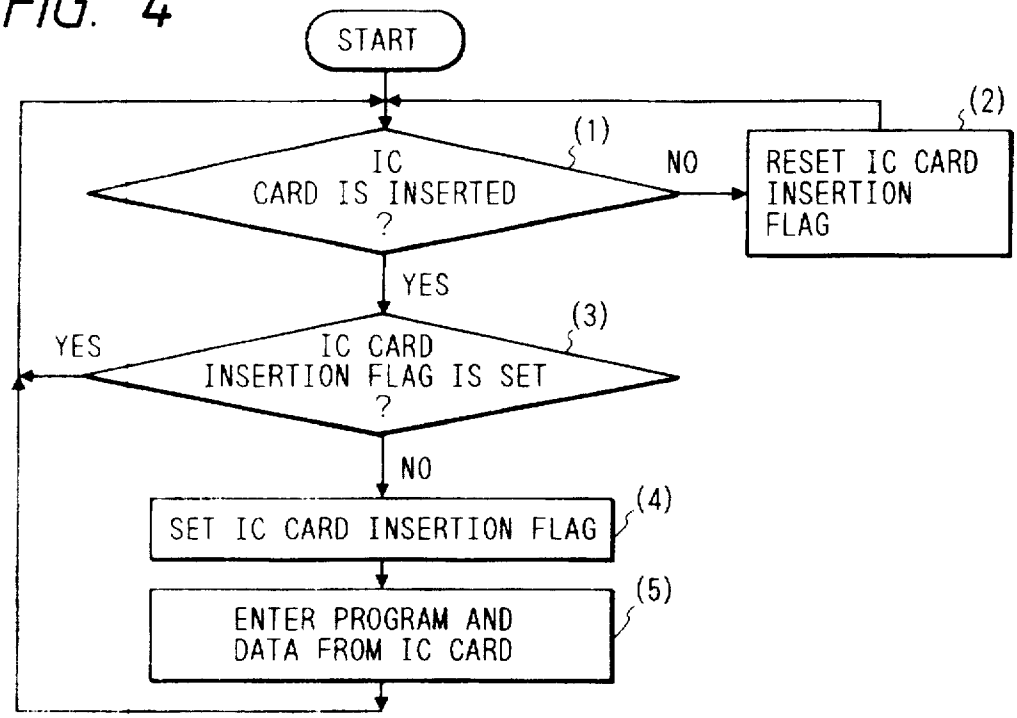
START
(1)
IC CARD IS INSERTED ?
NO
(2)
RESET IC CARD INSERTION FLAG
YES
(3)
IC CARD INSERTION FLAG IS SET ?
YES
NO
(4)
SET IC CARD INSERTION FLAG
(5)
ENTER PROGRAM AND DATA FROM IC CARD

FIG. 5

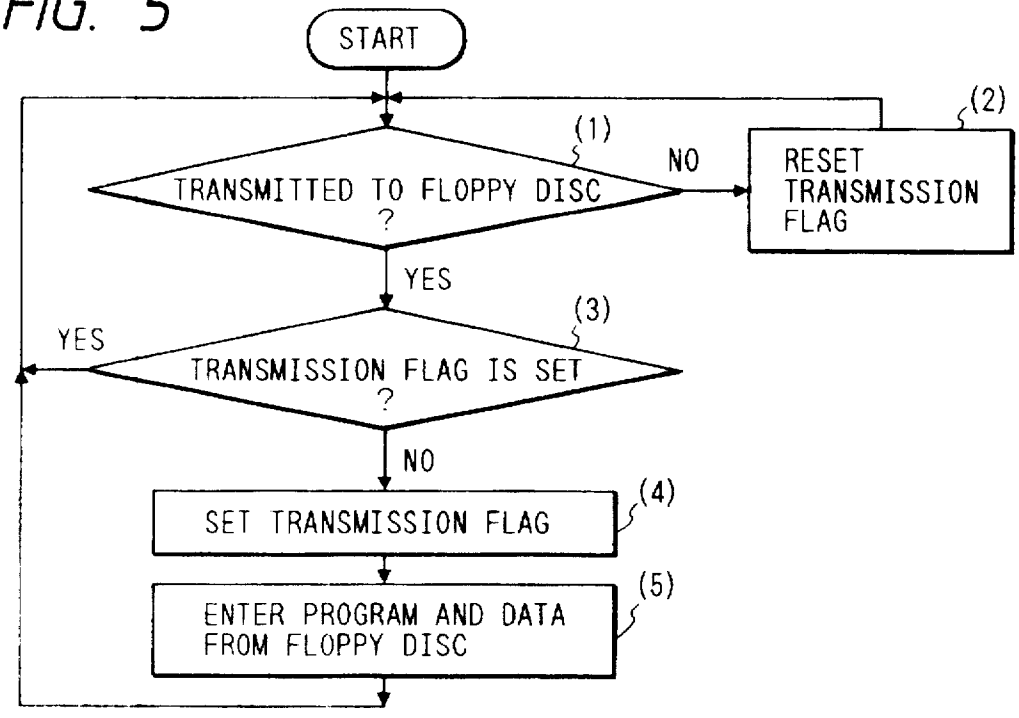
START
(1)
TRANSMITTED TO FLOPPY DISC ?
NO
(2)
RESET TRANSMISSION FLAG
YES
(3)
TRANSMISSION FLAG IS SET ?
YES
NO
(4)
SET TRANSMISSION FLAG
(5)
ENTER PROGRAM AND DATA FROM FLOPPY DISC

FIG. 6

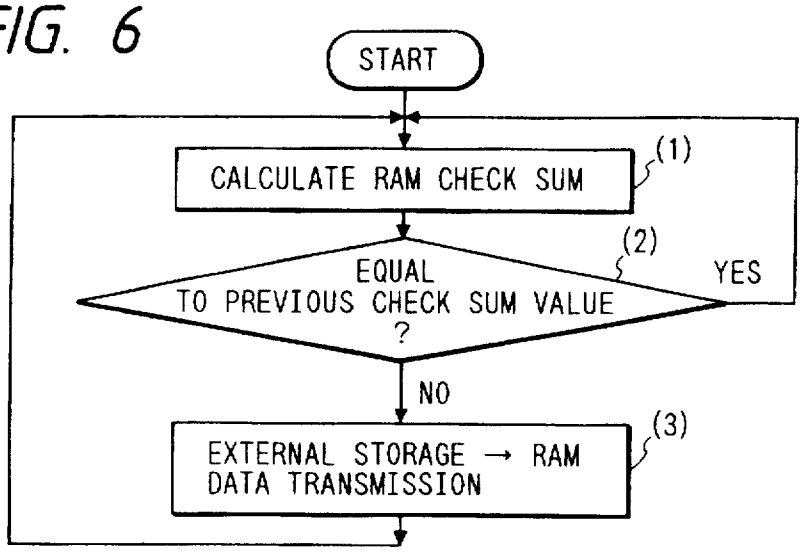
START
CALCULATE RAM CHECK SUM
(1)
EQUAL TO PREVIOUS CHECK SUM VALUE ?
(2)
YES
NO
EXTERNAL STORAGE → RAM DATA TRANSMISSION
(3)

FIG. 7

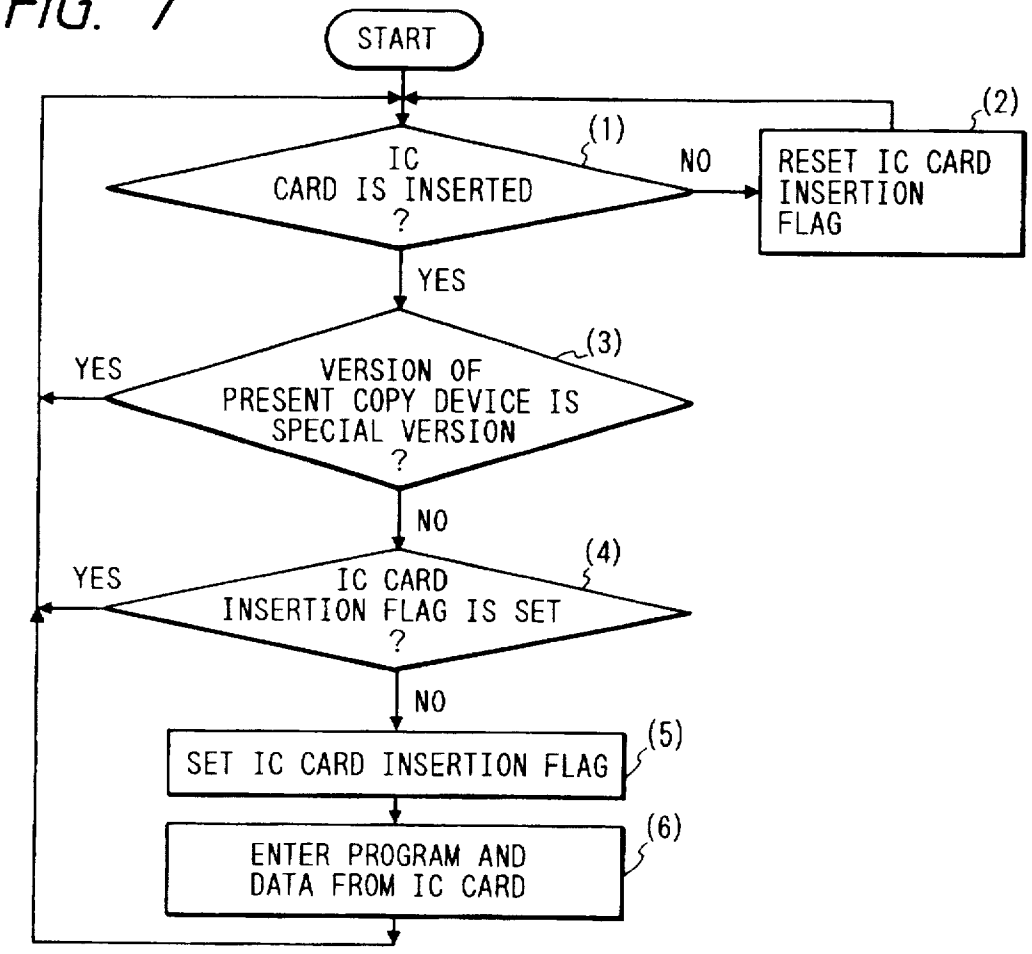
START
IC CARD IS INSERTED ?
(1)
NO
RESET IC CARD INSERTION FLAG
(2)
YES
VERSION OF PRESENT COPY DEVICE IS SPECIAL VERSION ?
(3)
YES
NO
IC CARD INSERTION FLAG IS SET ?
(4)
YES
NO
SET IC CARD INSERTION FLAG
(5)
ENTER PROGRAM AND DATA FROM IC CARD
(6)

FIG. 8

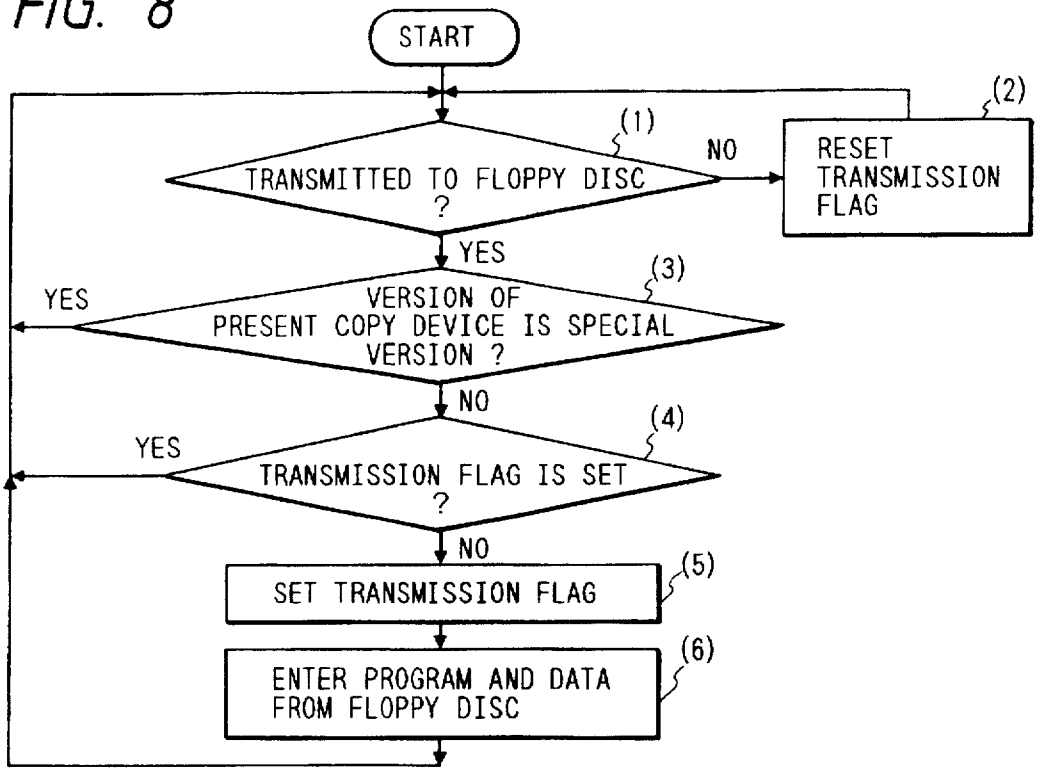
START
(1)
TRANSMITTED TO FLOPPY DISC ?
NO
(2)
RESET TRANSMISSION FLAG
YES
(3)
VERSION OF PRESENT COPY DEVICE IS SPECIAL VERSION ?
YES
NO
(4)
TRANSMISSION FLAG IS SET ?
YES
NO
(5)
SET TRANSMISSION FLAG
(6)
ENTER PROGRAM AND DATA FROM FLOPPY DISC

FIG. 9

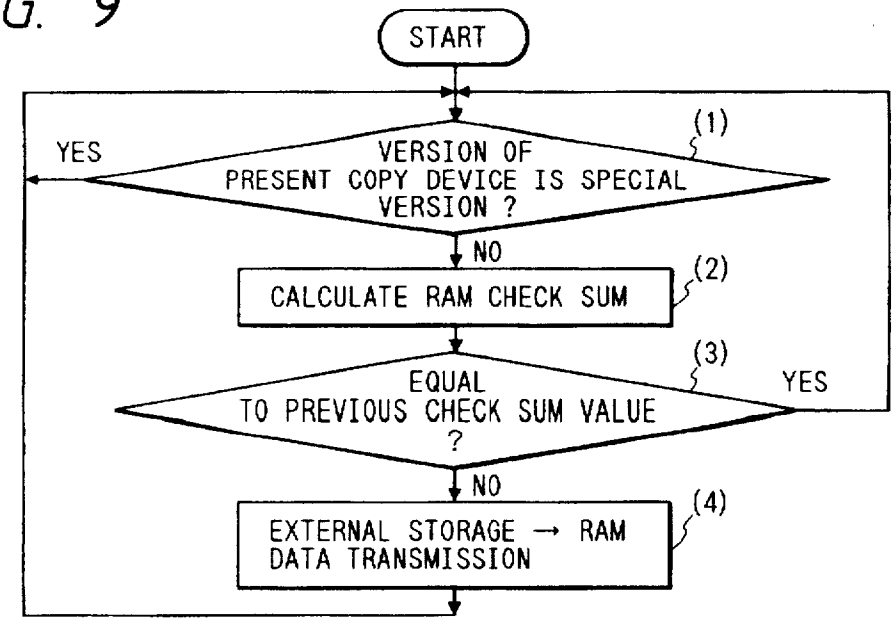
START
(1)
VERSION OF PRESENT COPY DEVICE IS SPECIAL VERSION ?
YES
NO
(2)
CALCULATE RAM CHECK SUM
(3)
EQUAL TO PREVIOUS CHECK SUM VALUE ?
YES
NO
(4)
EXTERNAL STORAGE → RAM DATA TRANSMISSION

IMAGE PROCESSING APPARATUS WHICH CAN UPDATE PROGRAM

This application is a continuation of application Ser. No. 07/953,024 filed Sep. 29, 1992, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a method of changing a program which is executed in an image processing apparatus.

2. Related Background Art

Hitherto, in a copy device which can execute the copying operation on the basis of data that is supplied from an external device through an external interface, for instance, when a power supply is turned on, the transmission of various data is started by communicating with the external device every turn-on of the power source.

On the other hand, to execute various operations, it is desired to transmit a program in addition to the data and to execute the operation on the basis of the program. There is, however, an inconvenience such that since the program and data are also transmitted even when they are not necessary, a transmitting time extremely increases and the ordinary copying operation enters a waiting state, so that the reliability of the copy device is remarkably deteriorated.

There is also a serious problem such that in the case where the program and data are damaged during the period of time of the turn-on of the power supply, the copying operation cannot be performed and the reliability of the copy device is remarkably deteriorated, or the like.

There is also an inconvenience such that in the case where the program of the copy device can be changed from the outside, even when a special program has already been stored, it is erroneously erased.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an image processing apparatus which can solve the above problems and also to provide a method of changing a program of the image forming apparatus.

Another object of the invention is to provide an image processing apparatus which can detect a version of a program and can prevent that the program is unexpectedly updated.

Still another object of the invention is to provide an image processing apparatus which can prevent a vain transmission of a program by controlling the transmission of the program in accordance with a change in state of an external device.

The above and other objects and features of the present invention will become apparent from the following detailed description and the appended claims with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram for explaining a construction of a copy device showing an embodiment of the invention;

FIG. **2** is a cross sectional view showing a hardware construction of the copy device main body shown in FIG. **1**;

FIG. **3** is a plan view for explaining a construction of an operating section which is arranged on an upper surface of the copy device main body shown in FIG. **1**;

FIG. **4** is a flowchart showing an example of an access processing procedure of an external storage device of the first embodiment in the copy device according to the invention;

FIG. **5** is a flowchart showing an example of an access processing procedure of an external storage device of the second embodiment in the copy device according to the invention;

FIG. **6** is a flowchart showing an example of an access processing procedure of an external storage device of the third embodiment in the copy device according to the invention;

FIG. **7** is a flowchart showing an example of an access processing procedure of an external storage device of the fourth embodiment in the copy device according to the invention;

FIG. **8** is a flowchart showing an example of an access processing procedure of an external storage device of the fifth embodiment in the copy device according to the invention; and

FIG. **9** is a flowchart showing an example of an access processing procedure of an external storage device of the sixth embodiment in the copy device according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** is a block diagram for explaining a construction of a copy device showing an embodiment of the invention.

In the diagram, reference numeral **800** denotes a control unit of a copy device main body **100** (which will be explained hereinlater) and **900** indicates a control unit of an operation panel **600** (which will be explained hereinlater).

In the control unit **800**, reference numeral **801** denotes a CPU to control the whole copy device and **901** indicates a CPU to control display means (LCD) **701** (which will be explained hereinlater) and LEDs to display various kinds of modes and the like which are arranged on the operation panel **600**. The CPUs **801** and **901** are connected to the respective component elements in the control unit through bus lines. Reference numerals **803** and **903** indicate read only memories (ROMs) in which control procedures which are executed by the CPUs **801** and **901** have been stored upon activation of the copy device main body **100**. Reference numeral **802** denotes a random access memory (RAM) in which the control procedures of the copy device main body **100** have been stored. The RAM **802** is backed up by a battery or the like. Even when a power supply of the copy device is turned off, the memory contents in the RAM **802** are held. In accordance with the control procedures stored in the RAM **802**, the CPU **801** controls the accessing operations to the RAM **802**, the ROM **803**, an input/output (I/O) port **804**, and interfaces **805** and **806** which are connected through a bus. Reference numeral **902** denotes a random access memory (RAM) to store control procedures of display means (LCD) **701** and LEDs to display various kinds of modes and the like. In accordance with the control procedures stored in the RAM **902**, the CPU **901** controls the accessing operations to the RAM **902**, the ROM **903**, an input/output (I/O) port **904**, a dual-port RAM **850**, and the like which are connected through a bus. The I/O port **804** generates a control signal of the CPU **801** to each load such as a main motor **113** or the like, which will be explained hereinlater, of the copy device. The I/O port **804** also receives state signals from sensors or the like arranged at a plurality of positions of the copy device main body **100** and transmits to the CPU **801**. On the other hand, the I/O port **904** functions as a port to generate control data from the CPU **901** to the display means (LCD) **701** to display a message and the LED to display various kinds of modes and

the like which are arranged on the operation panel **600**. The dual-port RAM **850** is connected to the CPUs **801** and **901** via the buses. The dual-port RAM **850** is used for communication between the CPUs **801** and **901**. The interfaces **805** and **806** are used for the CPU **801** to read out the memory contents from external storage devices **807** and **808** which function as external devices.

In the embodiment, an IC card and a floppy disc are used as external storage devices **807** and **808**. However, the interfaces **805** and **806** are constructed so that they can be also connected to the other kinds of external storage devices. Further, although the number of interfaces has been set to two in the embodiment, it is also obviously possible to cope with (expansion or deletion) various cases by properly increasing or decreasing the number of interfaces in accordance with the number of external storage devices.

In the copy device with the above construction, when the data or predetermined program stored in the external storage device **807** is transmitted to the RAM **802** by the CPU **801** or the like, the copy device main body **100** forms an image onto a recording medium on the basis of the data or predetermined program transmitted and stored in the RAM **802**. In this instance, when the changes in accessing states to the external storage devices **807** and **808** are detected by the CPU **801**, the CPU **801** controls the start and execution of the transmission on the basis of the result of the detection, thereby enabling the transmission timing to be managed.

Only when the CPU **801** detects the changes in the accessing states from the connection or disconnection of the external storage devices **807** and **808**, the transmission of the data or predetermined program can be started.

Further, only when the CPU **801** detects the changes in the accessing states from the presence or absence of the data transmission from the external device to the external storage devices **807** and **808**, the transmission of the data or predetermined program can be started.

On the other hand, only when the CPU **801** detects the changes in the accessing states from the coincidence state of the contents which are stored in the external storage devices **807** and **808** and RAM **802**, the transmission of the data or predetermined program can be started.

FIG. **2** is a cross sectional view showing a construction of the copy device main body **100** shown in FIG. **1**.

In the diagram, reference numeral **200** denotes a recyclic automatic document feeder (RDF) to automatically feed an original; **300** a sorter to sort the papers in which the copying processes have already been finished; and **400** an automatic computer form feeder (CFF). A system can be constructed by freely combining the RDF **200**, sorter **300**, and CFF **400** to the copy device main body **100**.

In the copy device main body **100**, reference numeral **101** denotes an original base glass as an original placing plate and **102** indicates an optical system comprising an original illuminating lamp (exposing lamp) **103**, a scanning mirror, a lens, a motor **104**, and the like. While scanning by the motor **104**, the original is illuminated by the exposing lamp **103**. The reflected light from the original is projected onto a photo sensitive drum **105** by the scanning mirror and the lens.

A high voltage unit **106**, a blank exposing unit **107**, a potential sensor **108**, a developing device **109**, a copy transfer charging device **110**, a separation charging device **111**, a cleaning device **112**, and the like are provided around the photo sensitive drum **105**. Image recording means is constructed by those component elements.

The photo sensitive drum **105** is rotated by the main motor **113** in the direction indicated by an arrow shown in FIG. **2**. The surface of the drum **105** has been corona-charged by the high voltage unit **106**. When the reflected light from the original is illuminated from the optical system **102** to the drum, an electrostatic latent image is formed. The latent image is developed by the developing device **109** and is visualized as a toner image. On the other hand, the copy transfer paper which has been fed into the copy device main body **100** from an upper cassette **114** or a lower cassette **115** through a pickup roller **116** or **117** by a feed roller **118** or **119** is fed to the drum **105** after the timing was adjusted by a resist roller **120** so that the front edge of the toner image coincides with the front edge of the copy transfer paper. The toner image is copy transferred onto the paper by the copy transfer charging device **110**. After completion of the copy transfer, the paper is separated from the drum **105** by the separation charging device **111** and is led to a fixing device **122** by a conveying belt **121** and the toner image is fixed by applying a pressure and heating. After that, the copy paper on which the image has been fixed is discharged to the outside of the copy device main body **100** by a discharge roller **123**. The surface of the drum **105** is cleaned by the cleaning device **112**.

A deck **124** on which, for example, 4000 copy transfer papers can be enclosed is installed in the copy device main body **100**. A lifter **125** of the deck **124** is lifted up in accordance with a quantity of copy transfer papers so that the top one of the papers is always come into contact with a feed roller **126**.

In FIG. **2**, reference numeral **127** denotes a discharge flapper to switch a conveying path of a copy transfer paper to either one of the inside of the copy device main body **100** and the discharge side (sorter **300**). Reference numeral **128** denotes a lower conveying path for turning back the copy transfer paper fed from the discharge roller **123** upside down through a reversing path **129** and for leading to a re-feed tray **130**. Reference numeral **131** denotes a multiplexing flapper to switch a conveying path of the copy transfer paper in accordance with either one of the both-side recording mode and the multiplexing recording mode. By folding down the flapper **131** to the left, the copy transfer paper is directly led to the lower conveying path **128** without passing through the reversing path **129**. Reference numeral **132** denotes a feed roller to feed the copy transfer paper to the drum **105** side via a path **133**. Reference numeral **134** denotes a discharge roller, arranged near the discharge flapper **127**, for discharging the copy transfer paper which has been switched to the discharge side by the discharge flapper **127** to the outside of the copy device main body.

In the both-side recording (both-side copying) mode or the multiplexing recording (multiplexing copying) mode, the flapper **127** is lifted up and the copied paper is enclosed onto the re-feed tray **130** through the paths **129** and **128** in a folding-back state. In the both-side recording mode, the multiplexing flapper **131** is folded down to the right. In the multiplexing recording mode, the flapper **131** is folded down to the left. In the back-side recording mode or the multiplexing recording mode which will be subsequently executed, the copy transfer papers enclosed on the re-feed tray **130** are led to the resist roller **120** of the copy device main body **100** one by one from the bottom through the path **133** by the feed roller **132**.

When the copy transfer paper is reversed and discharged from the copy device main body **100**, the discharge flapper **127** is lifted up, the multiplexing flapper **131** is folded down to the right, and the copied paper is conveyed to the reversing path **129** side. After the rear edge of the paper passed through a first feed roller **140**, the paper is conveyed

to a second feed roller **141** side by a reversing roller **142**. The paper is turned back upside down by the discharge roller **134** and is discharged to the outside of the copy device main body. Reference numeral **150** denotes a multiplexing hand-inserting tray and **210** indicates a reservation tray.

The document feeding means is constructed by the RDF **200** and comprises a plurality of feeding means. Each feeding means is driven by executing an RDF control program stored in the ROM **802** by the CPUs **801** and **901**.

In accordance with the copying mode which is set, the CPUs **801** and **901** select either one of the first feeding mode (forward feed) to feed the originals onto a mounting tray from a bundle of originals on the mounting tray without reversing the originals and the second feeding mode (reverse feed) to reverse and feed them and control each of the feeding means. For instance, in case of copying in the mode to obtain a both-side copy from a both-side original or the mode to obtain a one-side copy from each of the front and back surfaces of a both-side original, the feeding means is controlled so as to feed the originals onto the mounting tray from the bundle of originals put on the mounting tray in the first feeding mode (forward feed). In the mode to obtain a copy of the back surface of the original, the feeding means is controlled so as to convey the original from the mounting tray to the original base glass **101** in the first feeding mode (forward feed).

FIG. **3** is a plan view for explaining a construction of the operating section **600** which is provided on the upper surface of the copy device main body **100** shown in FIG. **1**.

In the diagram, reference numeral **601** denotes an asterisk key which is used in the setting mode when the operator (user) sets an amount of binding space, a size of original matting, or the like; **627** a cursor key which is used in the setting mode when the operator selects a set item; **628** an OK key which is used in the setting mode when the operator determines the set contents; and **606** an all reset key which is depressed to return the operating mode to the standard mode. The all reset key **606** is also depressed to return the operating mode from the automatic shut-off mode to the standard mode. Reference numeral **604** indicates a clear/stop key which funtions as a clear key in the standby mode and as a stop key during the copy recording operation. The clear/stop key **604** is also used to cancel the set number of copy papers. The clear/stop key **604** is also depressed to interrupt the continuous copying mode. After completion of the copying operation at a time point of the depression of the clear/stop key **604**, the copying operation is stopped. Reference numeral **605** denotes a copy start key.

Reference numeral **603** denotes a ten-key which is depressed to set the number of copy papers and is also depressed to set the asterisk (*) mode. Reference numeral **619** denotes a memory key by which the modes which are frequently used by the user can be registered. In this instance, four kinds of modes M_1 to M_4 can be registered. Reference numerals **611** and **612** denote copy density keys which are depressed to manually adjust a copy density; **613** an AE key which is used when the copy density is automatically adjusted in accordance with a density of original or when the AE (automatic density adjustment) is cancelled and copy density is manually adjusted; and **607** a copy sheet selection key which is depressed to select either one of the upper cassette **114**, lower cassette **115**, deck **124**, and multiplexing hand-inserting tray **150**. When the copy sheet selection key **607** is depressed in a state in which originals are put on the RDF **200**, an automatic paper cassette selecting (APS) mode is selected, so that the cassette of the same size as that of the original is automatically selected. Reference numeral **610** denotes an equivalent magnification key which is depressed to obtain a copy of the equal magnification (original size); **616** an automatic magnification key which is depressed to automatically designate the reduction or enlargement of the image of the original in accordance with the size of the copy transfer paper designated; **626** a both-side key which is depressed to obtain a both-side copy from a one-side original, a both-side copy from a both-side original, or a one-side copy from a both-side original; **625** a binding space key by which a binding space of the designated length can be formed to the left side of the copy transfer paper; **624** a photograph key which is depressed to copy a photograph original; **623** a multiplexing key which is depressed to form (synthesize) an image onto the same side of the copy transfer paper from two originals; and **620** an original matting key which is depressed when the user performs a matting process of an original of the fixed size. In this instance, the size of original is set by the asterisk key **601**. Reference numeral **621** denotes a sheet matting key which is depressed to perform the matting process to the original in accordance with the size of copy paper. Reference numerals **617** and **618** denote zoom keys.

Reference numeral **629** denotes a cover mode setting key which is used when a front cover or a back cover is formed or a binding paper is inserted; **630** a continuous page copy key which is used when the left and right pages of a double-spread book are continuously copied; and **614** a discharging method selection key to select either one of the discharging methods such as staple sorting method, sorting method, and group method. In the case where a staple sorter is connected, the copy papers after completion of the recording can be discharged and sorted in either one of the stable sorting mode, sorting mode, and group mode selected by the key **614**. The selected mode can be also cancelled by the key **614**. Reference numeral **631** denotes a reservation key which is used to start the setting of the copying mode to a reserved original put on the reservation tray **210** and to cancel the reservation set; **632** a reservation setting key which is used as a deciding key in the reserving mode which has been set; **633** a guide key which is used to display the descriptions of the functions corresponding to various kinds of keys onto a message display. Reference numeral **701** denotes the message display of the LCD (liquid crystal display) type to display the information regarding the copy. The message display **701** displays characters or a figure by (96×192) dots. For instance, the message display **701** displays the number of copy papers which has been set by the ten-key **603**, the copy magnification which has been set by fixed manification keys **608** and **609**, an equivalence magnification key **610**, or zoom keys **617** and **618**, the paper size which has been selected by the copy sheet selection key **607**, the message indicative of the state of the copy device main body **100**, the guide message to indicate an operating procedure, and the set contents of the various kinds of modes, and the like. Reference numeral **704** denotes an AE display which is lit on when the AE (automatic density adjustment) mode is selected by the AE key **613**.

Reference numeral **709** denotes a preheating display which is lit on in a preheating mode. When the RDF **200** is used in the standard mode, the number of copy papers is set to one, the density AE mode is set, the automatic sheet selecting mode is set, the equal magnification is set, and the copying mode to obtain a one-side copy from a one-side original is set. In the standard mode in a state in which the RDF **200** is not used, the number of copy papers is set to one, the density manual mode is set, the equal magnification is

set, and the copying mode to obtain a one-side copy from a one-side original is set. Whether the RDF **200** is used or not is discriminated by checking whether the original has been put on the RDF **200** or not. Reference numeral **615** denotes a folding key, **634** an interruption key, and **635** an ID key.

FIG. **4** is a flowchart showing an example of an access processing procedure of the external storage device in the first embodiment in the copy device according to the invention. Reference numerals (**1**) to (**5**) denote processing steps. FIG. **4** shows the case where the external storage device **807** in the embodiment is constructed by an IC card. First, a check is made to see if the IC card as an external storage device **807** has been inserted into a card inserting portion of the copy device or not (**1**). If NO, for instance, an IC card insertion flag which is set into a flag storage area that is held in the RAM **802** is reset (**2**). The processing routine is returned to step (**1**).

On the other hand, if YES in step (**1**), a check is made to see if the IC card insertion flag has been set or not (**3**). If YES in step (**3**), the processing routine is returned to step (**1**). If NO, the IC card insertion flag is set (**4**). The program and data are read out from the IC card as an external storage device **807** and the read-out program and data are stored into a data storage area in the RAM **802** through the interface **805** (**5**). After completion of the storing process, the processing routine is returned to step (**1**).

FIG. **5** is a flowchart showing an example of an access processing procedure of the external storage device in the second embodiment in the copy device according to the invention. Reference numerals (**1**) to (**5**) denote processing steps. In this instance, the external storage device **807** in the embodiment is constructed by a floppy disc and a communicating apparatus (for example, modem) (not shown) to communicate with a remote computer is connected to the floppy disc.

First, a check is made to see if a program and data of the copy device have been transmitted and stored from the communicating apparatus connected to the external storage device **807** or not (**1**). If NO, a transmission flag which is set into the flag storage area that is held in, for example, the RAM **802** is reset (**2**). The processing routine is returned to step (**1**).

On the other hand, if YES in step (**1**), a check is made to see if the transmission flag has been set or not (**3**). If YES in step (**3**), the processing routine is returned to step (**1**). If NO, the transmission flag is set (**4**). The program and data of the copy device are read out from the floppy disc as an external storage device **807** and are stored into the data storage area in the RAM **802** through the interface **805** (**5**). After completion of the storing process, the processing routing is returned to step (**1**).

FIG. **6** is a flowchart showing an example of an access processing procedure of the external storage device in the third embodiment in the copy device according to the invention. Reference numerals (**1**) to (**3**) denote processing steps. In this instance, the external storage device **807** in the embodiment is constructed by an IC card or a floppy disc and a communicating apparatus (not shown) to communicate with a remote computer is connected to the floppy disc.

First, a check sum of the program and data of the copy device stored in the RAM **802** is calculated (**1**). A check is made to see if the calculated check sum coincides with the previous check sum value which has calculated and stored in the RAM **802** or not (**2**). If YES, the processing routine is returned to step (**1**). If NO, the program and data of the copy device are stored into the data storage area in the RAM **802** from the floppy disc as an external storage device **807** through the interface **805**, or the program and data of the copy device are stored into the data storage area in the RAM **802** from the IC card as an external storage device **807** through the interface **805** (**3**). After that, the processing routine is returned to step (**1**). In this instance, the newly calculated check sum value is stored into the RAM **802** in place of the previous check sum value calculated.

FIG. **7** is a flowchart showing an example of an access processing procedure of the external storage device in the fourth embodiment in the copy device according to the invention. Reference numerals (**1**) to (**6**) denote processing steps. FIG. **7** shows the case where the external storage device **807** the embodiment is constructed by an IC card. First, a check is made to see if the IC card as an external storage device **807** has been inserted into the card inserting portion of the copy device or not (**1**). If NO, the IC card insertion flag which is set into the flag storage area that is held in, for example, the RAM **802** is reset (**2**). The processing routine is returned to step (**1**).

If YES in step (**1**), a check is made to see if the version of the program stored in the present copy device is a special version or not (**3**). The discrimination of the special version program will now be described. When the program is transmitted from the external storage device to the RAM **802** in the copy device, the code data indicative of the kind of program is also transmitted and stored into the RAM **802**. The code data includes data to indicate whether the program is the program for general users or the program for a special user or the program for a field test. When the code data stored in the RAM **802** is not the data indicative of the program for the general users, the CPU **801** determines that the version of the program stored at present is the special version. If YES in step (**3**), the processing routine is returned to step (**1**). If NO, a check is made to see if the IC card insertion flag has been set or not (**4**). If YES in step (**4**), the processing routine is returned to step (**1**). That is, the updating of the program is inhibited. If NO, the IC card insertion flag is set (**5**). The program and data of the copy device are read out from the IC card as an external storage device **807** and are stored into the data storage area in the RAM **802** through the interface **805** (**6**). After completion of the storing processing, the processing routine is returned to step (**1**).

FIG. **8** is a flowchart showing an example of an access processing procedure of the external storage device in the fifth embodiment in the copy device according to the invention. Reference numerals (**1**) to (**6**) denote processing steps. The external storage device **807** in the embodiment is constructed by a floppy disc. A communicating apparatus (for example, modem) (not shown) to communicate with a remote computer is connected to the floppy disc.

First, a check is made to see if the program and data of the copy device have been transmitted from the communicating apparatus (not shown) to the floppy disc as an external storage device **807** or not (**1**). If NO, a transmission flag which is set into a flag storage area that is held in, for example, the RAM **802** is reset (**2**). The processing routine is returned to step (**1**).

If YES in step (**1**), a check is made to see if the version of the program of the present copy device is a special version or not in a manner similar to that mentioned above (**3**). If YES, the processing routine is returned to step (**1**). If NO, a check is made to see if the transmission flag has been set or not (**4**). If YES in step (**4**), the processing routine is returned to step (**1**). If NO, the transmission flag is set (**5**). The

program and data of the copy device are read out from the floppy disc as an external storage device **807** and are stored into the data storage area in the RAM **802** through the interface **805** (**6**). After completion of the storing processing, the processing routine is returned to step (**1**).

FIG. **9** is a flowchart showing an example of an external device access processing procedure in the sixth embodiment in the copy device according to the invention. Reference numerals (**1**) to (**4**) denote processing steps. The external storage device **807** in the embodiment is constructed by an IC card or a floppy disc. A communicating apparatus as mentioned above is connected to the floppy disc.

First, a check is made to see if the version of the program of the present copy device is a special version or not in a manner similar to that mentioned above (**1**). If YES, the discrimination in step (**1**) is repeated. If NO, a check sum of the program and data of the copy device stored in the RAM **802** is calculated (**2**). A check is made to see if the calculated check sum value coincides with the previous check sum value which had been calculated or not (**3**). If YES, the processing routine is returned to step (**1**). If NO, the program and data of the copy device are stored into the data storage area in the RAM **802** through the interface **805** from the floppy disc as an external storage device **807** or the program and data of the copy device are stored into the data storage area in the RAM **802** through the interface **805** from the IC card as an external storage device **807** (**4**). The processing routine is returned to step (**1**).

In the above fourth to sixth embodiments, when the version of the program stored in the copy device is the special version, it is possible to prevent that the program is unexpectedly rewritten. When the special version program has been rewritten, it is sufficient that a service mode for a service person is set and a command to erase the program is generated from the operating section of the copy device and a new program is supplied.

The present invention is not limited to the foregoing embodiments but many modifications and variations are possible within the spirit and scope of the appended claims of the invention.

What is claimed is:

1. An image forming apparatus comprising:

image forming means;

an inserting unit for inserting a storage medium which is freely attachable and detachable and in which programs to control said image forming means and version data indicating versions of the programs have been stored;

a memory to store the program and the version data which are read out from said storage medium;

loading means for loading the program and the version data stored in said storage medium into said memory; and

control means for controlling said image forming means in accordance with the program stored in said memory, wherein said control means includes discrimination means for discriminating whether the program already stored in said memory is a special version program or not on the basis of the version data already stored in said memory, and

wherein when a new program is loaded by said loading means, said control means controls said loading means in a manner such that when said discrimination means discriminates that the program already stored in said memory is the special version program, the loading of the new program from the storage medium to said memory by said loading means is inhibited so as not to rewrite the program already stored in said memory, and when said discrimination means discriminates that the program already stored in said memory is other than the special version program, the loading of the new program from the storage medium to said memory by said loading means is permitted so as to rewrite the program already stored in said memory, and

wherein even if the program already stored in said memory is the special version program, said control means permits the loading of the new program when an instruction for erasing the special version program is input in a service mode for a serviceman.

2. An apparatus according to claim **1**, wherein, when no program has been previously stored in said memory, said control means controls said loading means so as to execute the loading of the program from the storage medium to said memory.

3. An apparatus according to claim **1**, wherein said control means discriminates the kind data stored in said memory when the storage medium is inserted into said inserting unit.

4. An image forming apparatus comprising:

image forming means;

communicating means for communicating with a remote computer;

a memory to store a program to control the image forming means and version data indicating a version of said program which are received from said communicating means; and

control means for controlling the image forming means in accordance with the program stored in said memory,

wherein said control means includes discrimination means for discriminating whether the program already stored in said memory is a special version program or not on the basis of the version data already stored in said memory, and

wherein when a new program received by said communicating means is stored in said memory, said control means controls said memory means in a manner such that when said discrimination means discriminates that the program already stored in said memory is the special version program, the storing of the new program received by said communicating means to said memory is inhibited so as not to rewrite the program already stored in said memory, and when said discrimination means discriminates that the program already stored in said memory is other than the special version program, the storing of the new program received by said communicating means to said memory is permitted so as to rewrite the program already stored in said memory, and

wherein even if the program already stored in said memory is the special version program, said control means permits the loading of the new program when an instruction for erasing the special version program is input in a service mode for a serviceman.

5. An apparatus according to claim **4**, wherein said control means stores the program received by said communicating means into said memory when no program has been previously stored in said memory.

6. An apparatus according to claim **4**, wherein said control means discriminates the kind data stored in said memory in response to a receiving of the program by said communicating means.

7. A renewing method for a program in an image forming apparatus that comprises an image forming means, comprising the steps of:

a) inserting a storage medium in which a program for controlling said image forming means and version data indicating a version of said program are stored, into an inserting unit;

b) discriminating whether a version of the program already stored in a memory of said image forming apparatus is a special version or not on the basis of the version data stored in said memory;

c) inhibiting rewriting the program already stored in said memory by the program stored in the storage medium inserted in the step a), when it is discriminated that the version of the program already stored in said memory is a special version in the step b,

permitting rewriting the program already stored in said memory by the program stored in the storage medium inserted in the step a), when it is discriminated that the version of the program already stored in said memory is not the special version in the step b; and

d) permitting the storing of the program stored in the storage medium into said memory when an erasing instruction of the program of the special version is input in a service mode even if it is discriminated that the program already stored in said memory is the program of the special version.

8. A renewing method of a program in an image forming apparatus that comprises an image forming means, comprising the steps of:

a) receiving a program for controlling the image forming means and version data indicating a version of said program, from a remote location;

b) discriminating whether a version of the program already stored in a memory of said image forming apparatus is a special version or not on the basis of version data stored in said memory;

c) inhibiting rewriting the program already stored in said memory by the program received in said step a), when it is discriminated that the version of the program already stored in said memory is the special version in the step b,

permitting rewriting the program already stored in said memory by the program received in said step a), when it is discriminated that the version of the program already stored in said memory is not the special version in the step b, and

d) permitting the storing of the program received in the said step a) into said memory when an erasing instruction of the program of the special version is input in a service mode even it is discriminated that the program already stored in said memory is the program of the special version.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 5,752,040

DATED : May 12, 1998

INVENTOR(S): SATOSHI KANEKO, ET AL.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

COLUMN 3

Line 13, "(expansion or deletion) various cases" should read --various cases (expansion or deletion)--;
Line 57, "photo sensitive" should read --photosensitive--;
Line 64, "photo sensitive" should read --photosensitive--;
Line 66, "photo sensitive" should read --photosensitive--.

COLUMN 4

Line 67, "passed" should read --is passed--.

COLUMN 5

Line 41, "funtions" should read --functions--.

COLUMN 6

Line 19, "of original" should read --of an original--;
Line 49, "mauification" should read --magnification--.

COLUMN 7

Line 51, "routing" should read --routine--;
Line 64, "has" should read --has been--.

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 5,752,040

DATED : May 12, 1998

INVENTOR(S): SATOSHI KANEKO, ET AL.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

COLUMN 8

Line 13, "where the" should read --where in the--;
Line 14, "the embodiment is" should read --is the embodiment--.

COLUMN 9

Line 56, "wherein" should read --¶ wherein--.

COLUMN 12

Line 23, "even it" should read --even when it--.

Signed and Sealed this

Twenty-ninth Day of June, 1999

Attest:

Q. TODD DICKINSON

Attesting Officer

Acting Commissioner of Patents and Trademarks