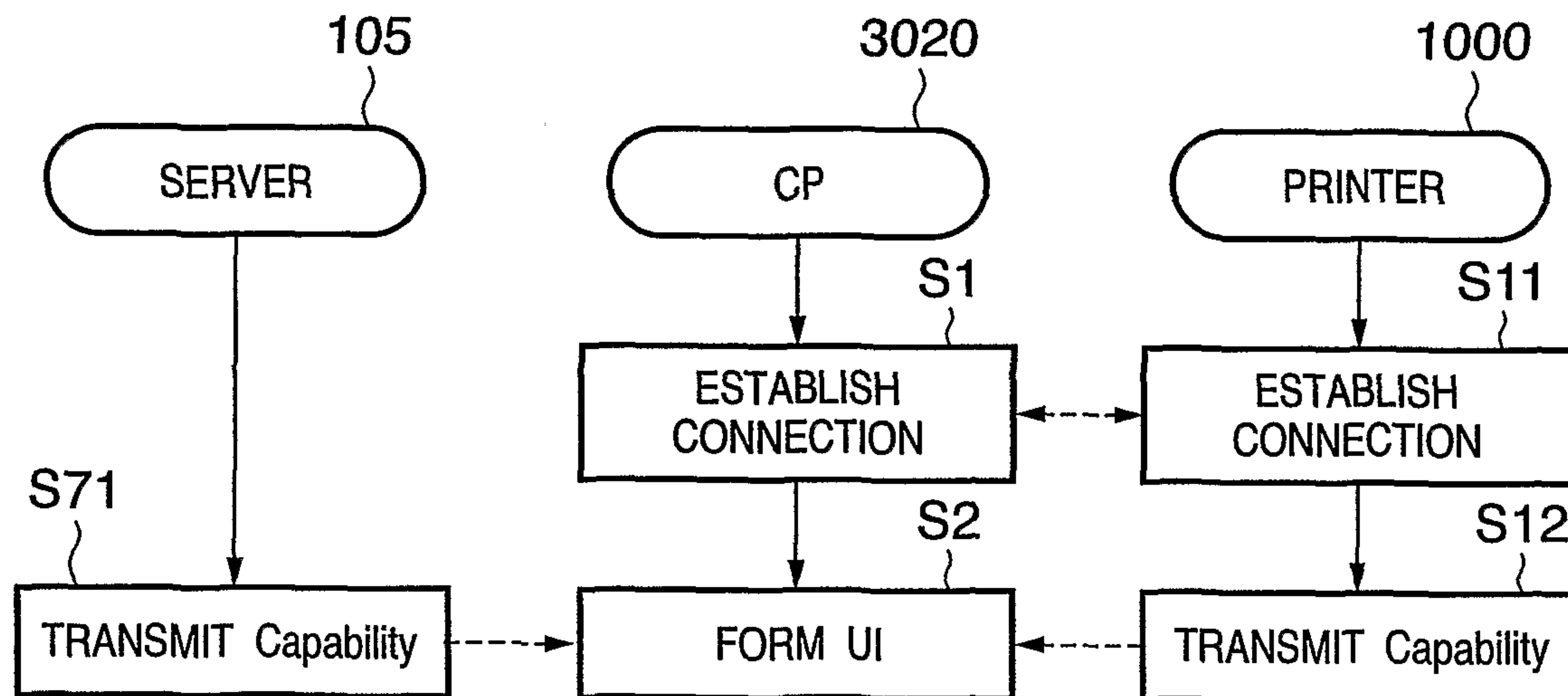




(86) Date de dépôt PCT/PCT Filing Date: 2005/08/25
(87) Date publication PCT/PCT Publication Date: 2006/03/02
(85) Entrée phase nationale/National Entry: 2007/01/30
(86) N° demande PCT/PCT Application No.: JP 2005/015957
(87) N° publication PCT/PCT Publication No.: 2006/022429
(30) Priorité/Priority: 2004/08/27 (JP2004-249020)

(51) Cl.Int./Int.Cl. *H04N 5/76* (2006.01),
H04N 1/00 (2006.01), *H04N 5/765* (2006.01),
H04N 5/91 (2006.01)
(71) Demandeur/Applicant:
CANON KABUSHIKI KAISHA, JP
(72) Inventeurs/Inventors:
AICHI, TAKAO, JP;
YAMADA, AKITOSHI, JP;
HASHII, YUSUKE, JP;
HIRABAYASHI, HIROMITSU, JP
(74) Agent: RIDOUT & MAYBEE LLP

(54) Titre : APPAREIL DE COMMUNICATION PORTABLE, SYSTEME D'IMPRESSION ET PROCEDE DE COMMANDE
(54) Title: PORTABLE COMMUNICATION APPARATUS, PRINT SYSTEM, AND CONTROL METHOD THEREOF



(57) **Abrégé/Abstract:**

In a print system for causing a printer to print an image on the basis of image data supplied from a portable communication apparatus by direct communication between the portable communication apparatus and the printer, the print function of the printer is obtained. When print conditions input by using the UI of the portable communication apparatus cannot be implemented by the print function of the printer, the portable communication apparatus requests a server to execute corresponding processing. A result processed by the server is received, and the printer is caused to print the image.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
2 March 2006 (02.03.2006)

PCT

(10) International Publication Number
WO 2006/022429 A1

(51) International Patent Classification:

H04N 5/76 (2006.01) *H04N 5/765* (2006.01)
H04N 5/91 (2006.01) *H04N 1/00* (2006.01)

(74) Agent: OHTSUKA, Yasunori; 7th FL., SHUWA KIOI-CHO PARK BLDG., 3-6, KIOICHO, CHIYODA-KU, Tokyo 1020094 (JP).

(21) International Application Number:

PCT/JP2005/015957

(22) International Filing Date: 25 August 2005 (25.08.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

2004-249020 27 August 2004 (27.08.2004) JP

(71) Applicant (for all designated States except US): CANON KABUSHIKI KAISHA [JP/JP]; 3-30-2, Shimomaruko, Ohta-ku, Tokyo 1468501 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): AICHI, Takao [JP/JP]; c/o CANON KABUSHIKI KAISHA, 3-30-2, Shimomaruko, Ohta-ku, Tokyo 1468501 (JP). YAMADA, Akitoshi [JP/JP]; c/o CANON KABUSHIKI KAISHA, 3-30-2, Shimomaruko, Ohta-ku, Tokyo 1468501 (JP). HASHII, Yusuke [JP/JP]; c/o CANON KABUSHIKI KAISHA, 3-30-2, Shimomaruko, Ohta-ku, Tokyo 1468501 (JP). HIRABAYASHI, Hiromitsu [JP/JP]; c/o CANON KABUSHIKI KAISHA, 3-30-2, Shimomaruko, Ohta-ku, Tokyo 1468501 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

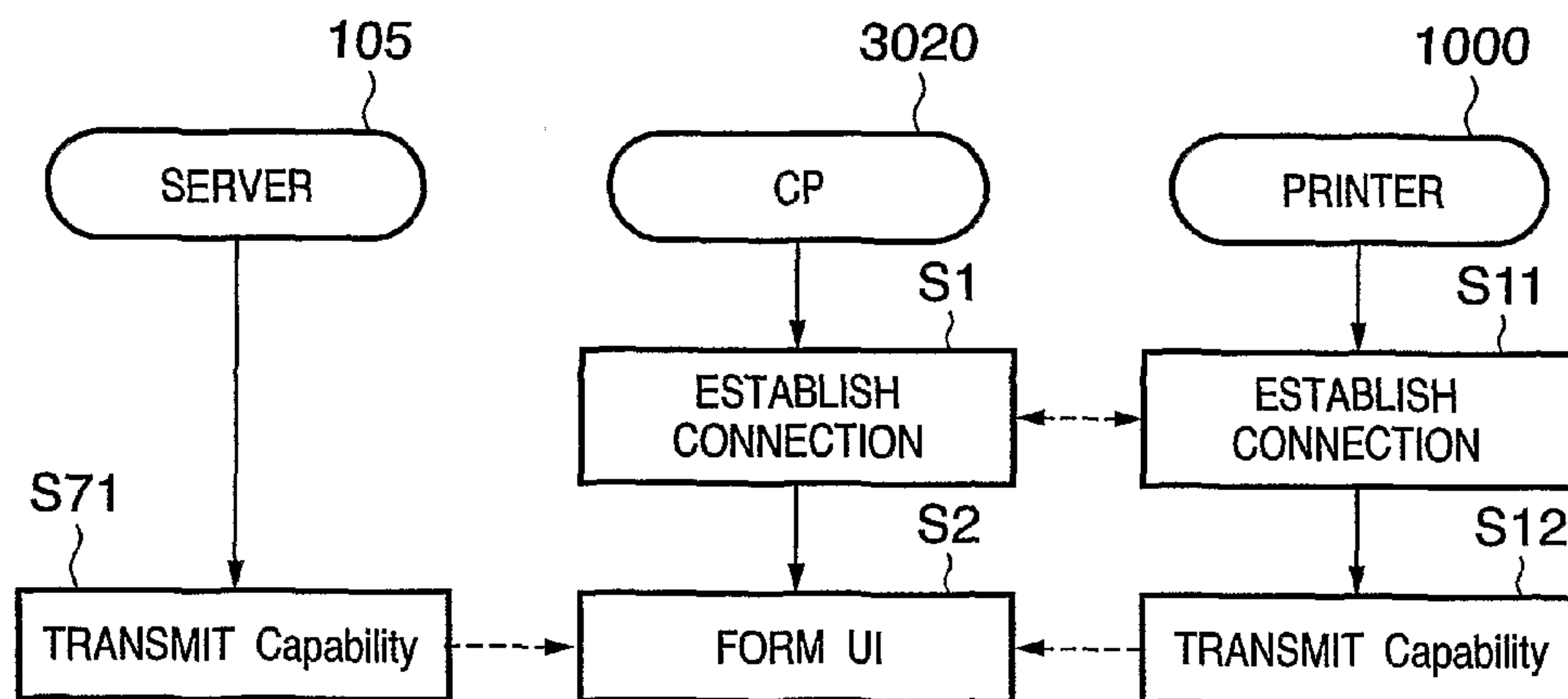
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PORTABLE COMMUNICATION APPARATUS, PRINT SYSTEM, AND CONTROL METHOD THEREOF



(57) Abstract: In a print system for causing a printer to print an image on the basis of image data supplied from a portable communication apparatus by direct communication between the portable communication apparatus and the printer, the print function of the printer is obtained. When print conditions input by using the UI of the portable communication apparatus cannot be implemented by the print function of the printer, the portable communication apparatus requests a server to execute corresponding processing. A result processed by the server is received, and the printer is caused to print the image.

WO 2006/022429 A1

DESCRIPTION

PORTABLE COMMUNICATION APPARATUS, PRINT SYSTEM, AND
CONTROL METHOD THEREOF

5 TECHNICAL FIELD

The present invention relates to a print system which causes a printer to print an image on the basis of image data supplied from a portable communication apparatus by direct communication between the portable
10 communication apparatus and the printer, a portable communication apparatus, and a control method thereof.

BACKGROUND ART

In recent years, digital cameras capable of
15 sensing an image and outputting the sensed image as digital image data are widely used. Cellular phones having such a camera function are also becoming popular. To print an image sensed by a camera or cellular phone and use it as a photo, normally, the
20 digital image data is temporarily captured from the digital camera or cellular phone to a PC (personal computer). After image processing is executed by the PC, the image data is output from the PC to a printer such as a color printer and printed.

25 Recently, a color print system capable of transmitting digital image data directly from a camera to a printer without intervening a PC and printing the

image data, and a so-called photo-direct (PD) printer capable of inserting a memory card, which is loaded in a camera to store sensed image data, directly in a color printer, and reading out and printing the image data stored in the memory card are also developed. Especially, a system which can directly transfer image data from a camera to a color printer through an interface such as a USB and print the image data is called a camera direct, USB direct, or digital camera direct print and is beginning to widely penetrate among users who are not good at PC operations. Since an industrial standard specification "PictBridge" which defines the communication protocol in camera direct print has been announced recently, transmitting image data directly from a camera to a printer and printing the data are becoming prevalent.

Printers which employ the camera direct print function are commercially available now. Along with this, new solutions for cellular phones with a camera function also begin to appear so that an image sensed by a cellular phone is transferred directly to a printer and printed by employing the direct print function.

In PictBridge, image data corresponding to the capability of a printer is supplied from an image supply device (digital camera or cellular phone) to the printer. Many images sensed by the above-described

cellular phone having a camera function are encoded by EXIF/JPEG. The printer can also cope with EXIF/JPEG as an image format. Upon printing using such printer, encoded image data is sent directly to the printer
5 through a USB cable.

Many printers can process only the EXIF/JPEG image format which is suitable for photo print. It is however expected that cellular phones will be able to handle a variety of image formats in the future to meet
10 the demands of the market.

Especially for cellular phone users, various kinds of communication services using the Internet or original communication networks are provided, including mail services as a representative one. The mail
15 services include a service to attach photo image data or data of another format to mail, which allows users to exchange image data of various formats. Hence, in camera direct print, a desire to handle image data of various kinds of formats except the above-described
20 image format will arise obviously.

However, since resources that can be installed in a printer are limited, it is very difficult to cope with such a variety of image formats. Since even a digital camera or cellular phone cannot be equipped
25 with all functions to cope with the variety of image formats, it is not practical to cope with all image formats.

To connect such a camera to the Internet and execute image processing impossible for the camera, a technique has been proposed (Japanese Patent Laid-Open No. 2001-189886), in which image data is transferred to
5 a server on the Internet to cause the server to manipulate and convert the sensed image, and the converted image data is received.

However, in the above-described technique of Japanese Patent Laid-Open No. 2001-189886, at most,
10 functions unavailable in a camera are executed by a server. When a camera and a printer are connected to execute print, functions (e.g., N-up print or date print) out of the Capability of the printer cannot be implemented. In the conventional mechanism, an N-up
15 print or date print designation can be selected on the camera-side UI in accordance with the Capability of the printer. If the function (N-up or date print) is not included in the Capability of the printer, there is no means to instruct print by operations on the cellular
20 phone side.

DISCLOSURE OF INVENTION

It is an object of the present invention to overcome the drawbacks of the prior arts.

25 A characteristic feature of the present invention is to provide portable communication apparatus and print system which can execute print by implementing a

function unavailable in the portable communication apparatus or a printer by causing a server to execute the function unavailable in the printer when image data is supplied directly from the portable communication apparatus to the server to execute print, and a control method thereof.

According to an aspect of the present invention, there is provided with a print system for causing a printer to print an image on the basis of image data supplied from a portable communication apparatus by direct communication between the portable communication apparatus and the printer, comprises:

obtaining means for obtaining a print function of the printer;

input means for inputting print conditions;
means for, in a case where the print conditions input by the input means are not within the print function of the printer obtained by the obtaining means, causing the portable communication apparatus to request a server to execute corresponding processing; and

print control means for controlling to cause the printer to print the image on the basis of a result processed by the server.

Further, according to an aspect of the present invention, there is provided with a portable communication apparatus for supplying image data to a

printer and causing the printer to print the image data by direct communication with the printer, comprising:

obtaining means for obtaining a print function of the printer;

5 input means for inputting print conditions;

means for, in a case where the print conditions input by the input means are not within the print function of the printer obtained by the obtaining means, requesting, through a communication network, a
10 server to execute corresponding processing; and

print control means for controlling to cause the printer to print the image on the basis of a result processed by the server.

Other features, objects and advantages of the
15 present invention will be apparent from the following description when taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

20

BRIEF DESCRIPTION OF DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention and, together
25 with the description, serve to explain the principles of the invention.

Fig. 1 depicts a view for explaining a print

system according to an embodiment of the present invention;

Fig. 2 is a block diagram showing the arrangement of a camera-equipped cellular phone (CP) according to
5 the embodiment;

Fig. 3 depicts a perspective view showing the outer appearance of a photo direct printer according to the embodiment of the present invention;

Fig. 4 depicts a view of the operation panel of
10 the PD printer according to the embodiment;

Fig. 5 is a block diagram showing the arrangement of main parts related to control of the PD printer according to the embodiment;

Fig. 6 is a block diagram showing the arrangement
15 of the ASIC of the PD printer according to the embodiment;

Fig. 7 depicts a view for explaining an approximate signal flow in a print system employing PictBridge when a print request is issued from the CP
20 to the PD printer to execute print;

Fig. 8 is a flowchart for explaining a processing flow when communication is executed between a camera-equipped cellular phone (CP) and a PD printer according to the first embodiment of the present
25 invention to supply image data from the CP to the PD printer and print the image data;

Fig. 9 depicts a view for explaining the UI of

the CP according to the embodiment;

Fig. 10 is a flowchart for explaining data exchange between the CP and a server according to the first embodiment;

5 Fig. 11 is a flowchart for explaining data exchange between the CP and the server in another detailed example (N-up print) of the first embodiment;

Figs. 12 and 13 are flowcharts for explaining a processing flow when communication is executed between
10 a camera-equipped cellular phone (CP) and a PD printer according to the second embodiment of the present invention to supply image data from the CP to the PD printer and print the image data;

Fig. 14 is a flowchart for explaining data
15 exchange between the CP and a server according to the second embodiment of the present invention;

Fig. 15 is a flowchart for explaining processing according to the third embodiment of the present invention; and

20 Fig. 16 is a flowchart for explaining a processing flow when communication is executed between a camera-equipped cellular phone (CP), the PD printer, and the server according to the first embodiment of the present invention to form a UI in the CP.

25

BEST MODE FOR CARRYING OUT THE INVENTION

Preferred embodiments of the present invention

will be described below in detail with reference to the accompanying drawings. The following embodiments are not intended to limit the appended claims of the present invention, and not all combinations of features
5 described in the embodiments are essential for the solving means of the present invention. In the embodiments to be described below, a cellular phone obtains the Capability of a printer at the time of confirming the connection or before the start of print.
10 The cellular phone can be connected to the Internet and transmit/receive data to/from a server through the Internet. Further, although the embodiments are explained in a case where a cellular phone is used as an image supply device, the present invention is not
15 limited to the case of the cellular phone, and a portable communications apparatus such as a PDA, a mobile PC and the like may be applied.

Fig. 1 depicts a view for explaining a print system according to an embodiment of the present
20 invention.

As the basic arrangement of the print system, communication is executed between a camera-equipped cellular phone (CP) 3020 and a photo direct printer (PD printer) 1000 through a general-purpose interface to
25 supply image data from the CP 3020 to the PD printer 1000 and print the image data. The general-purpose interface includes a USB and a wireless interface such

as IEEE.11B/G. The CP 3020 need not always have the camera function and may be able to receive image data from, e.g., a provider 104 or 203.

Referring to Fig. 1, an access point 102, service
5 provider 104, server 105, and content provider 203 are connected to Internet 101. The CP 3020 can communicate with the Internet 101 through the access point 102. In this arrangement, the CP 3020 can receive various kinds of information provided from the service provider 104
10 and display them on the display unit of the CP 3020. Alternatively, the CP 3020 can receive music or image data provided from the content provider 203, save them in the memory of the CP 3020, display them on a display unit 35 (Fig. 2) of the CP 3020, or reproduce the data
15 from a speaker 44 (Fig. 2) of the CP 3020 as an acoustic signal. The arrangement of the PD printer 1000 will be described later in detail.

To print an image sensed by the CP 3020, image data received from a provider, or an image received
20 from another cellular phone, the CP 3020 confirms the function (Capability) of the PD printer 1000 connected through an interface. To print image data which cannot cope with the function of the PD printer 1000 or execute print in a print mode unavailable in the PD
25 printer 1000, the image data is transmitted to the server 105 through the Internet 101 to make the server 105 convert the image data to an image format or image

data adapted to the print conditions of the PD printer 1000. The converted image data is received from the server 105 through the Internet 101. The received converted image data is transmitted from the CP 3020 to
5 the PD printer 1000 and printed.

If the amount of image data to be processed is large, and the server 105 is expected to take a long time to convert the image data, the image data is transmitted to the server 105 to make it convert the
10 image data into an image format or image data adapted to the print conditions of the PD printer 1000. The converted image data is temporarily stored in the memory of the server 105. The CP 3020 receives a URL representing the address of the image data stored in
15 the server 105 from the server 105. When the CP 3020 wants to print the image data, it accesses the URL to obtain the converted image data. The obtained image data is transmitted from the CP 3020 to the PD printer 1000 and printed.

20 Fig. 2 is a block diagram showing the arrangement of the camera-equipped cellular phone (CP) 3020 according to this embodiment. The hardware of such a camera-equipped cellular phone is known and will be described briefly.

25 Referring to Fig. 2, a CPU 31 controls the entire CP 3020 in accordance with a control program stored in a ROM 32. The ROM 32 stores a program which describes

processing procedures (firmware) to be executed by the CPU 31 (the firmware is formed from a writable nonvolatile memory such as a flash memory assuming that upgrading is executed appropriately). A RAM 33 is used
5 as a work area during processing executed by the CPU 31 and temporarily stores various kinds of data. An operation button & switch group 34 includes a ten-key pad used to input numbers and characters, call key, and switches to instruct various kinds of functions. A
10 liquid crystal display unit 35 is used to confirm, on the screen, an image sensed by using the camera function or an image stored in a memory card 40 or display a menu for various settings. The operation button & switch group 34 and display unit 35 function
15 as the user interface of the entire system in implementing a direct print system. An optical unit 36 mainly has a lens and a driving system for it. A CCD element 37 converts an image formed by the optical unit 36 into an electrical signal. A driver 38 controls the
20 optical unit 36 under the control of the CPU 31 to execute auto-focus control or stop adjustment. The memory card 40 is a storage medium such as a Compact Flash (registered trademark) memory card or Smart Media (registered trademark) and is connected to a bus
25 through a connector 39. A wired interface 41 is a USB interface (slave side of the USB) to connect to a PC 3010 or the PD printer 1000 according to this

embodiment. A wireless interface 42 causes the cellular phone to communicate with a base station. A microphone 43 and a speaker 44 are used in speech communication by the telephone. The speaker 44 is also
5 used to reproduce, e.g., music contents received from a provider. A JPEG/MPEG encoder 45 encodes image data into JPEG or MPEG codes. As described above, the CP may have a wireless interface (not shown) to connect to the PD printer 1000. Although not illustrated in Fig.
10 2, a battery and an antenna are also included.

The basic arrangement of the camera-equipped cellular phone according to this embodiment has been described above. The cellular phone has various kinds of functions to be described below. The functions
15 include, e.g., print processing in the printer, processing request to the server through the Internet, data transmission/reception to/from the server, calendar display, mail transmission/reception control, UI generation, and image processing based on the UI.
20 These functions will be described later in detail.

Fig. 3 depicts a perspective view showing the outer appearance of the photo direct printer (to be referred to as a PD printer hereinafter) 1000 according to the embodiment of the present invention. The PD
25 printer 1000 has a normal PC printer function of receiving data from a host computer (PC) and printing the data and a function of directly reading out and

printing image data stored in a storage medium such as a memory card or receiving image data from a digital camera or PDA and printing the data.

Referring to Fig. 3, the main body as the outer
5 shell of the PD printer 1000 according to this
embodiment has exterior members including a lower case
1001, upper case 1002, access cover 1003, and discharge
tray 1004. The lower case 1001 forms an approximate
lower half part of the PD printer 1000, and the upper
10 case 1002 forms an approximate upper half part of the
main body. A hollow structure having a storage space
inside is formed by combining the two cases to store
mechanisms to be described later. Openings are formed
in the upper and front surfaces. The discharge tray
15 1004 is rotatably held at its one end by the lower case
1001. The opening formed in the front surface of the
lower case 1001 can be opened/closed by rotating the
discharge tray 1004. In executing the print operation,
the discharge tray 1004 is rotated to the front surface
20 side to open the opening. Printed paper sheets
(including plain paper, dedicated paper, and resin
sheet; to be simply referred to as a sheet hereinafter)
can be discharged from there. The discharged paper
sheets can be stacked sequentially. Two auxiliary
25 trays 1004a and 1004b are stored in the discharge tray
1004. When the trays are pulled out to the front as
needed, the sheet support area can be increased or

decreased in three steps.

The access cover 1003 is rotatably held at its one end by the upper case 1002. The opening formed in the upper surface can be opened/closed by rotating the access cover 1003. When the access cover 1003 is opened, a printhead cartridge (not shown) or ink tank (not shown) stored in the main body can be exchanged. Although not particularly illustrated here, when the access cover 1003 is opened/closed, a projection formed on its rear surface rotates a cover open/close lever. When the rotation position of the lever is detected by, e.g., a micro switch, the open/close state of the access cover 1003 can be detected.

A power key 1005 is provided on the upper surface of the upper case 1002. An operation panel 1010 having a liquid crystal display unit 1006 and various kinds of key switches is provided on the right side of the upper case 1002. The structure of the operation panel 1010 will be described later in detail with reference to Fig. 4. An automatic feeder 1007 automatically feeds sheets into the apparatus main body. A sheet clearance select lever 1008 adjusts the clearance between the printhead and a sheet. A card slot 1009 receives an adapter in which a memory card can be installed. Image data stored in the memory card can directly be fetched and printed through the adapter. As the memory card (PC), a Compact Flash (registered trademark) memory,

Smart Media, or a memory stick can be used. A viewer (liquid crystal display unit) 1011 is detachable for the main body of the PD printer 1000. The viewer 1011 is used to display each frame image or an index image in, e.g., searching for an image to be printed from images stored in a PC card. A USB terminal 1012 is used to connect a digital camera (to be described later). A USB connector to connect a personal computer is provided on the rear surface of the PD printer 1000.

Fig. 4 depicts a view of the operation panel 1010 of the PD printer 1000 according to this embodiment.

Referring to Fig. 4, the liquid crystal display unit 1006 displays menu items to set various data related to items printed on the right and left sides. The items to be displayed here include, e.g., the number of the first print target photo image of a plurality of photo image files, a designated frame number (start frame designation/print frame designation), the last photo number to be printed (end), the number of printouts (number of copies), the type of sheet to be used for print (paper type), the number of photos to be printed on one sheet (layout), designation of print quality (quality), designation of ON/OFF of photographing date print (date print), designation of ON/OFF of correction of photos (image correction), and the number of sheets necessary for print (number of sheets). These items are selected or

designated by using a cursor key 2001. Every time a mode key 2002 is pressed, the type of print (e.g., index print, all frame print, one frame print, and designated frame print) can be changed, and a
5 corresponding LED of an LED 2003 is turned on. A maintenance key 2004 is used for cleaning of the printhead or maintenance of the printer. A print start key 2005 is pressed to instruct the start of print or establish maintenance setting. A print stop key 2006
10 is pressed to stop print or instruct to stop maintenance.

The arrangement of main parts related to control of the PD printer 1000 according to the first embodiment will be described next with reference to
15 Fig. 5. The same reference numerals as in the above-described drawings denote the same parts in Fig. 5, and a description thereof will be omitted.

Fig. 5 is a block diagram showing the arrangement of main parts related to control of the PD printer
20 according to this embodiment.

Referring to Fig. 5, reference numeral 3000 denotes a control unit (control board); numeral 3001 denotes an ASIC (dedicated custom LSI); numeral 3002 denotes a DSP (Digital Signal Processor). The DSP 3002
25 incorporates a CPU to execute various kinds of control processing (to be described later), conversion from a luminance signal (RGB) to a density signal (CMYK), and

image processing such as scaling, gamma conversion, and error diffusion. A memory 3003 to store the control program of the CPU of the DSP 3002, a RAM area to store a program during execution, and a memory area which
5 functions as a work memory to store image data. As a printer engine 3004, a printer engine for an ink-jet printer which prints a color image by using a plurality of color inks is mounted. A SUB-USB 3005 serving as a port to connect a digital camera (DSC) 3012. The
10 SUB-USB 3005 has the connector 1012. The DSC 3012 or camera-equipped cellular phone (CP 3020) is connected to the connector 1012. A connector 3006 is used to connect the viewer 1011. When the PD printer 1000 executes print on the basis of image data from the PC
15 3010, a USB hub 3008 passes the data from the PC 3010 and outputs the data to the printer engine 3004 through a USB 3021. With this arrangement, the connected PC 3010 can directly exchange data and signals with the printer engine 3004 and execute print (the printer
20 functions as a general PC printer). A power connector 3009 receives a DC voltage converted from a commercial AC voltage by a power supply 3019. The PC 3010 is a general personal computer. Reference numeral 3011 denotes the above-described memory card (PC card); and
25 numeral 3012 denotes the digital camera (DSC: Digital Still Camera).

Signal exchange between the control unit 3000 and

the printer engine 3004 is done through the above-described USB 3021 or IEEE 1284 bus 3022.

Fig. 6 is a block diagram showing the arrangement of the ASIC 3001 of the PD printer 1000 according to this embodiment. The same reference numerals as in the above-described drawings denote the same parts in Fig. 6, and a description thereof will be omitted.

A PC card interface unit 4001 reads image data stored in the installed PC card 3011 or writes data in the PC card 3011. An IEEE 1284 interface unit 4002 exchanges data with the printer engine 3004. The IEEE 1284 interface unit 4002 is a bus used in printing image data received from the DSC 3012 or CP 3020 or stored in the PC card 3011. A USB interface unit 4003 exchanges data with the PC 3010. A USB host interface unit 4004 exchanges data with the connected DSC 3012 or CP 3020. An operation panel interface unit 4005 inputs various kinds of operation signals from the operation panel 1010 or outputs display data to the display unit 1006. A viewer interface unit 4006 controls display of image data on the viewer 1011. An interface unit 4007 controls the interface to various kinds of switches & LED 4009. A CPU interface unit 4008 controls data exchange with the DSP 3002. An internal bus (ASIC bus) 4010 connects the above-described units.

Fig. 7 depicts a view for explaining an approximate signal flow in the above-described print

system when a print request is issued from the CP 3020 to the PD printer 1000 to execute print.

These processing procedures are executed after the PD printer 1000 and CP 3020 are connected via a USB
5 cable, or it is confirmed by wireless communication that these devices are compliant to DPS conditions. First, the CP 3020 transmits "Configure Print Service" to the PD printer 1000 to check the status of the PD printer 1000 (600). The PD printer 1000 transmits its
10 status at that time ("idle" status here) at that point of time (601). Since the PD printer is in the "idle" status, the CP 3020 inquires about the Capability of the PD printer 1000 (602) and obtains its Capability from the PD printer 1000. The CP 3020 issues a print
15 start request (Start Job) corresponding to the Capability (603). The print start request is issued from the CP 3020 to the PD printer 1000 when "new Job OK" in the status information from the PD printer 1000 (to be described later) is "True" in 601.

20 In response to the print start request, the PD printer 1000 requests the information of the file from the CP 3020 on the basis of the file ID of print-instructed image data (GetFileInfo) (604). In response to this request, the CP 3020 transmits the
25 information of the file (FileInfo). The information of the file contains, e.g., a file capacity. Upon receiving the information of the file and determining

that the file is processible, the PD printer 1000 requests the file from the CP 3020 (GetFile) (605). The image data of the requested file is sent from the CP 3020 to the PD printer 1000. When the PD printer 5 1000 starts print processing, status information representing "progress of print (Printing)" is sent from the PD printer 1000 to the CP 3020 by "NotifyDeviceStatus" in 606. When print processing of one page is ended, the PD printer 1000 sends a print 10 completion notification of one page by "NotifyJobStatus" at the start of processing of the next page (607). If the number of pages to be printed is one, the PD printer 1000 sends a notification indicating that it is in the "idle" status by 15 "NotifyDeviceStatus" at the end of print of the requested page (NotifyDeviceStatus(Idle)) (608).

For example, in N-up print to lay out a plurality of (N) images on one page, "NotifyJobStatus" (607) is sent from the PD printer 1000 to the CP 3020 every time 20 N images are printed. The issue timings of "NotifyJobStatus" and "NotifyDeviceStatus" and the image data obtaining order of this embodiment are merely examples, and various cases are possible depending on the specifications of products.

25 [First Embodiment]

Fig. 8 is a flowchart for explaining a processing flow when communication is executed between a

camera-equipped cellular phone (CP) 3020 and a PD printer 1000 according to the first embodiment of the present invention to supply image data from the CP 3020 to the PD printer 1000 and print the image data.

5 Referring to Fig. 8, steps S1 to S9 indicate processing by the CP 3020. Steps S11 to S17 indicate processing by the PD printer 1000. Steps S21 to S23 indicate processing by a server 105.

In steps S1 and S11, the CP 3020 and PD printer
10 1000 mutually confirm that they are compliant to direct print conditions. At this time, the CP 3020 inquires of the PD printer 1000 about its status and device information. In response to this inquiry, the PD printer 1000 returns its status and device information
15 at that point of time. The device information contains, e.g., the version of the connection protocol and the vender name and model name of the printer. The CP 3020 requests the Capability from the PD printer 1000, as indicated by 602 in Fig. 7.

20 In step S12, the PD printer 1000 creates capability information (Capability) about its print function and transmits the Capability to the CP 3020. The CP 3020 receives the Capability and generates and displays a UI on a display unit 35 in step S2. At this
25 time, a UI capable of instructing even a print function unavailable in the PD printer 1000 is displayed.

Fig. 9 depicts a view for explaining the UI of

the CP 3020 according to the first embodiment. The same reference numerals as in Fig. 2 denote the same parts in Fig. 9. The CP 3020 is of a folding type. Fig. 9 shows a state wherein the CP 3020 is unfolded to
5 make display on the display unit 35 visible.

Referring to Fig. 9, the display unit 35 displays a print menu. Each print item can be designated by selecting it by using cursor & select keys 801. For example, when "image/index" print 9001 is selected,
10 image print or index print can be designated. When image print is designated, images stored in a memory card 40 are displayed as indices. One or a plurality of images to be printed can be selected by the user and printed. "Layout print" 9002 is valid only in the
15 image print mode in which a plurality of images are laid out and printed on one paper sheet. When the "layout print" is set to "ON", a window to set the number of images to be laid out is displayed. With "date print" 9003 and "bordering print" 9004, whether
20 to print a date on an image and whether to print an image with a border (bordering print) are designated. "Save in server" 9005 is selected to temporarily store, in the server 105, an image file converted by the server 105 (this processing will be described later).
25 "Designate URL" 9006 is selected to designate a URL at which an image file is stored by the server 105 and print the image. When "designate URL" 9006 is turned

on, a window to input a URL is displayed, or several URL candidates registered in advance are displayed.

"Start print" 9007 is selected to instruct the start of print.

- 5 In step S3, the user of the CP 3020 selects an image to be printed by referring to the formed UI window, sets the print format of the image, and instructs the start of print processing. In step S4, it is determined whether the print function set by
- 10 using the UI includes a print function unavailable in the PD printer 1000. If NO in step S4, the flow advances to step S6 to create a print job file on the basis of a user's designation. In step S7, the print job file is transmitted to the PD printer 1000.
- 15 In step S13, the print job file is received by the PD printer 1000. Upon receiving the print job file, the PD printer 1000 analyzes the received print job file to prepare for print in step S14. An "image file information obtaining request" of the print
- 20 target, which is described in the print job file, is issued to the CP 3020. On the basis of image file information transmitted from the CP 3020 in response to the request, the PD printer 1000 requests, from the CP 3020, the image file containing the image data to be
- 25 actually printed and obtains the image file (step S14). Upon receiving the image file to be printed, the PD printer 1000 decodes the image data of the image file

and executes image processing to convert the image data into an image of a format printable by the PD printer 1000 (step S15). In step S16, print is executed on the basis of the converted image data. When print of the
5 image data of the image file is completed, in step S17, the PD printer 1000 notifies the CP 3020 that print of the image file is completed. Upon receiving the print end notification in step S8, the CP 3020 ends the processing.

10 If YES in step S4, the flow advances to step S5 to request the server 105 to process the image to satisfy the print function.

A detailed example will be described below.

In the CP 3020, image data to be printed is
15 sensed by using the camera function prepared in the CP 3020, encoded to a predetermined format, and stored in the memory card 40 or a nonvolatile memory in the main body. In this embodiment, assume that the format of the stored image is the PNG format. The PNG format is
20 an image format employing lossless encoding to ensure a high compression rate and is widely used recently.

Assume that the image format processible by the PD printer 1000 is defined as "EXIF" or "JPEG" in the Capability obtained from the PD printer 1000 in step S2
25 described above. In this case, even when image data of PNG format is transmitted from the CP 3020 to the PD printer 1000, the PD printer 1000 cannot decode or

print the image data. Also assume that the CP 3020 itself has no image format conversion function because of constraints on the device. At this time, the CP 3020 can transmit the image data of PNG format to the server 105 through Internet 101 and requests the server 105 to convert the PNG format to the EXIF/JPEG format.

Upon receiving the request in step S21, the server 105 executes processing to convert the received image format to the designated image format (EXIF/JPEG format here) (step S22). The processed image file is transmitted to the CP 3020 (step S23).

The converted and transmitted image file is received by the CP 3020 in step S9. The CP 3020 creates a print job file on the basis of the image file. In step S7, the created print job file is transmitted to the PD printer 1000. From then, the same processing as in steps S8 and S13 to S17 described above is executed.

The server 105 of this embodiment needs to have a function of interpreting request information received from the CP 3020 and a function of decoding an image of PNG format and encoding it to an image of EXIF/JPEG format. In addition to the above-described format conversion function, the server 105 may also have another format conversion information and an encoding/decoding function to cope with, e.g., the XHTML format or GIFF format.

When the request from the CP 3020 is received in step S21, and the server 105 has no function corresponding to the request, the server 105 may notify the CP 3020 of it. In this case, the CP 3020 may
5 change the UI to notify the user that print is impossible.

In the above-described embodiment, one image is transmitted from the CP 3020 to the PD printer 1000 and printed. However, the embodiment can also be applied
10 to a print job which combines various kinds of print layout services such as multiple image print, image print in a form corresponding to another Capability, and image print based on DPOF.

As an example, N-up print will be described.
15 Assume that two images are selected by using the UI of the CP 3020 in step S3 to execute 2-up print (to print two images on one paper sheet) although it is apparent in advance from the Capability of the PD printer 1000 that it has no 2-up print function.

20 In this case, since the PD printer 1000 does not have the print function, the server 105 is requested to execute image processing for 2-up print in step S5. The two selected EXIF/JPEG image files to be printed are transmitted to the server 105 together with 2-up
25 conversion information. Upon receiving the information in step S21, in step S22, the server 105 reduces the received EXIF/JPEG image data and lays out the two

selected images on one paper sheet on the basis of layout information, thereby creating one new EXIF/JPEG image data for 2-up. In step S23, the created image file is transmitted to the CP 3020.

5 The CP 3020 creates a print job file on the basis of the received image file and transmits the print job file to the PD printer 1000 to print it, like normal single image print (Fig. 8).

 As image conversion processing that the server
10 105 is asked to do, paper layout has been described as an example. In addition to it, the present invention can be applied to various image processes such as fixed size print, date print, file name print, and cropping print.

15 Fig. 10 is a flowchart for explaining data exchange between the CP 3020 and the server 105 according to the first embodiment. The CP 3020 and server 105 are TCP/IP-connected. As the communication protocols between the devices, HTTP generally used in a
20 network is used.

 In this embodiment, the service provided by the server 105 converts a PNG image file, which is sent from the client to a predetermined address of the server 105 by an HTTP POST method, into an EXIF/JPEG
25 image file and supplies the converted EXIF/JPEG image file for an HTTP GET method executed by the client for the predetermined address on the side of the server

105. Assume that the CP 3020 has already obtained the IP address and service form of the server 105 by any existing mechanism (not shown).

In step S101, the CP 3020 transmits a PNG image file to be converted to the server 105 by using the HTTP POST method. Reference numeral 901 denotes an example of the HTTP POST request. A POST destination "xyz/input/" described on the first line indicates the "destination to which the service user should send the PNG image file", which is defined in the service provided by the server 105. In transmission source information "abc:pn-abc" of the second line, "abc" indicates the address of the client (CP 3020) as the transmission source, and "pn-abc" describes a port number to be used by the client as the transmission source in the HTTP POST method. In "CONTENT-LENGTH" of the third line, the data size of the PNG image file attached to the HTTP POST request is described. In "CONTENT-TYPE" of the fourth line, a character string "img/png" indicating the PNG image file is described. The PNG image file is attached as binary data from the line after next to "CONTENT-TYPE", i.e., from the sixth line from the top.

The server 105 receives the PNG image file in step S111 and holds it inside in step S112 (the file is held in "xyz/input/" here, though any other holding format and location can be used). In step S113, the

server 105 notifies the CP 3020 that the HTTP POST request is normally processed. Reference numeral 910 denotes an example of an HTTP POST response in which "200 OK" described in the first line indicates normal
5 termination.

When this normal response is received in step S102, the flow advances to step S103. The CP 3020 transmits, to the server 105, an obtaining request of the converted image file, i.e., the EXIF/JPEG image
10 file converted from the PNG image file by using the HTTP GET method. Reference numeral 902 denotes an example of the HTTP GET request. The GET destination "xyz/output/abc.jpg" described on the first line indicates the "destination to be designated by the
15 service user in requesting sending of an EXIF/JPEG image file", which is defined in the service provided by the server 105. The description of the second line is the same as in 901. In "CONTENT-TYPE" of the third line, a character string "img/jpg" indicating the
20 converted JPEG image file is described.

When this request is received by the server 105 in step S114, the flow advances to step S115 to convert the held PNG image file into an EXIF/JPEG image file. In step S116, the converted EXIF/JPEG image file is
25 sent to the CP 3020 as an HTTP GET response. Reference numeral 911 denotes an example of the HTTP GET response in which "200 OK" described on the first line indicates

normal termination. In "CONTENT-LENGTH" of the second line, the data size of the EXIF/JPEG image file attached to the HTTP GET response is described. In "CONTENT-TYPE" of the third line, a character string
5 "img/jpg" indicating the EXIF/JPEG image file is described. The EXIF/JPEG image file is attached from the line after next to "CONTENT-TYPE", i.e., from the fifth line from the top.

The converted image data is received by the CP
10 3020 in step S104. In step S105, the received converted EXIF/JPEG image file is obtained.

Fig. 11 is a flowchart for explaining data exchange between the CP 3020 and the server 105 in another detailed example (N-up print) of the first
15 embodiment.

In the first embodiment, the service provided by the server 105 combines one EXIF/JPEG image file from an N-up image combination request XML script, which is sent from a client to a predetermined address of the
20 server 105 by the HTTP POST method, and EXIF/JPEG image files the number of which is described in the XML script. The combined EXIF/JPEG image file is supplied for an HTTP GET method executed by the client for the predetermined address on the server. Assume that the
25 CP 3020 has already obtained the IP address and service form of the server 105 by any existing mechanism (not shown), as in Fig. 10 described above.

In step S121, the CP 3020 sends to the server 105 by using the HTTP POST method an XML script describing the number of EXIF/JPEG image files to be combined. Reference numeral 920 denotes an example of the HTTP POST request. The first and second lines are the same as in 901 in Fig. 10, and a description thereof will be omitted. In "CONTENT-LENGTH" of the third line, the size of the XML script which describes the number of files to be combined and is attached to the HTTP POST request is described. In "CONTENT-TYPE" of the fourth line, a character string "text/xml" indicating the XML script is described. The XML script which describes the number of files to be combined is described from the line after next to "CONTENT-TYPE", i.e., from the sixth line from the top. In addition, "n-up-request" of the seventh line indicates that the request is a combination request of a plurality of images, and "002" described in "number" of the eighth line indicates that the CP 3020 wants to combine two images.

20 The server 105 receives the N-up request in step S131 and notifies the CP 3020 in step S132 that the HTTP POST request is normally processed. Reference numeral 930 denotes an example of the HTTP POST response in which "200 OK" described in the first line indicates normal termination.

25 Upon receiving this response (step S122), the CP 3020 transmits the first EXIF/JPEG image file to be

combined to the server 105 by using the HTTP POST method in step S123. Reference numeral 921 denotes an example of the HTTP POST request. The first and second lines are the same as in 901 in Fig. 10, and a
5 description thereof will be omitted. In "CONTENT-LENGTH" of the third line, the data size of the first EXIF/JPEG image file to be combined, which is attached to the HTTP POST request, is described. In "CONTENT-TYPE" of the fourth line, a character string
10 "img/jpg" indicating the EXIF/JPEG image file is described. The first EXIF/JPEG image file to be combined is attached from the line after next to "CONTENT-TYPE", i.e., from the sixth line from the top.

This image file is received by the server 105 in
15 step S133. The server 105 holds the received first EXIF/JPEG image file (the file is held in "xyz/input/" here, though any other holding format and location can be used) and notifies the CP 3020 that the HTTP POST request is normally processed (step S134). Reference
20 numeral 931 denotes an example of the HTTP POST response.

Upon receiving this response (step S124), the CP 3020 transmits the second EXIF/JPEG image file to be combined in step S125, as in step S123. In steps S135
25 and S136, the server 105 executes holding and response, as in steps S133 and S134.

In steps S121 to S126, the number of image files

requested by the CP 3020 to be combined and the image files are transmitted. In step S127, the CP 3020 transmits an obtaining request of the combined EXIF/JPEG image file by using the HTTP GET method.

5 Reference numeral 922 denotes an example of the HTTP GET request. The GET destination "xyz/output/abc.jpg" described on the first line indicates the "destination to be designated by the service user in requesting sending of a combined EXIF/JPEG image file", which is
10 defined in the service provided by the server 105. The description of the second line is the same as in 902 in Fig. 10. In "CONTENT-TYPE" of the third line, a character string "img/jpg" indicating the EXIF/JPEG image file is described.

15 Upon receiving this request in step S137, the server 105 combines the two held EXIF/JPEG image files into one EXIF/JPEG image file (step S138). In step S139, the combined EXIF/JPEG image file is sent to the CP 3020 as an HTTP GET response. Reference numeral 933
20 denotes an example of the HTTP GET response in which "200 OK" described on the first line indicates normal termination. In "CONTENT-LENGTH" of the second line, the data size of the EXIF/JPEG image file attached to the HTTP GET response is described. In "CONTENT-TYPE"
25 of the third line, a character string "img/jpg" indicating the EXIF/JPEG image file is described. The EXIF/JPEG image file is attached from the line after

next to "CONTENT-TYPE", i.e., from the fifth line from the top.

The CP 3020 receives this image file in step S128 and obtains the received combined EXIF/JPEG image file
5 in step S129.

As described above, in the first embodiment, HTTP is used as the communication protocol, and the HTTP POST method and HTTP GET method are used. However, the two methods need not always be used. HTTP PUT may be
10 used, and any other protocol may be used.

In the service provided by the server 105 of the first embodiment, a PNG image file POSTed from the client to a predetermined address of the server 105 is converted. Instead, the PNG image file to be converted
15 may be specified by any other method of, e.g., requesting the PNG image file by description in a script POSTed from the client.

In the service provided by the server 105 of the first embodiment, when GET is done from the client to a
20 predetermined address of the server 105, the EXIF/JPEG image file is converted and sent. Instead, the image file to be converted may be requested by any other method of, e.g., requesting the image file by description in a script POSTed from the client. Image
25 conversion can be executed any time and may be executed before the converted image sending request is issued from the client. Alternatively, the EXIF/JPEG image

files to be combined, the number of images to be combined, and the combination method may be specified by any other method of, e.g., simply determining the number of images to be combined and the combination
5 method on the basis of the number of times of POST of EXIF/JPEG image files executed before the HTTP GET request is sent from the client.

Fig. 16 is a flowchart for explaining a processing flow when communication is executed between
10 the camera-equipped cellular phone (CP) 3020, the PD printer 1000, and the server 105 according to the first embodiment of the present invention to form a UI in the CP 3020. Referring to Fig. 16, steps S1 and S2 indicate processing by the CP 3020. Steps S11 and S12
15 indicate processing by the PD printer 1000. Step S71 indicates processing by the server 105. Steps S1 and S11 are the same as in Fig. 8, and a description thereof will be omitted.

The CP 3020 requests the Capability from the PD
20 printer 1000, as indicated by 602 in Fig. 7. In step S12, the PD printer 1000 creates capability information (Capability1) about its print function and transmits the Capability1 to the CP 3020. The CP 3020 receives the Capability1. The CP 3020 also requests the
25 Capability from the server 105. In step S71, the server 105 creates capability information (Capability2) about its service function and transmits the

Capability2 to the CP 3020. The CP 3020 receives the Capability2.

In step S2, the CP 3020 forms an UI by using the received Capability1 of the PD printer 1000 and
5 Capability2 of the server 105 and displays the UI on the display unit 35. In this case, it is not always guaranteed that the service function Capability2 of the server 105 is superior to the print function Capability1 of the PD printer 1000. Hence, the CP 3020
10 may compare the Capability1 and Capability2 and form a UI on the basis of Capability determined as a higher function. Alternatively, the CP 3020 may create Capability3 by combining superior parts of the Capability1 and Capability2 and form a UI on the basis
15 of the Capability3. As a result, a UI capable of instructing even a print function unavailable in the PD printer 1000 can be displayed.

As the method of causing the CP 3020 to request the Capability from the server 105, any method can be
20 used. An existing standard method (e.g., UPnP) may be used, or scripts based on original rules may be exchanged by using the HTTP method.

[Second Embodiment]

The second embodiment of the present invention
25 will be described next. In the above-described first embodiment, when the CP 3020 requests image processing from the server 105, and for example, the amount of

image data is so enormous that the processing time in the server 105 becomes long, communication timeout may occur in print processing between the CP 3020 and the PD printer 1000. In this case, in the second

5 embodiment, image data converted in a server 105 is temporarily stored in a database 105a (Fig. 1) provided in the server 105. The server 105 notifies a CP 3020 of only a URL indicating the storage address.

Upon receiving the address, the CP 3020 forms a
10 UI capable of designating the URL and instructing print and displays the UI on a display unit 35 (Fig. 9).

When the user designates the URL by using the UI and instructs a PD printer 1000 to print, the CP 3020 reads out corresponding image data from the database 105a on
15 the basis of the URL. The image data is transmitted to the PD printer 1000 and printed. The arrangement of a print system and the hardware configurations of the CP 3020 and PD printer 1000 according to the second embodiment are the same as in the above-described first
20 embodiment, and a description thereof will be omitted.

Figs. 12 and 13 are flowcharts for explaining processing flows when communication is executed between the camera-equipped cellular phone (CP) 3020 and the PD printer 1000 according to the second embodiment of the
25 present invention to supply image data from the CP 3020 to the PD printer 1000 and print the image data. The same step numbers as in Fig. 8 denote the same

processing steps in the flowchart of Fig. 12, and a description thereof will be omitted.

In step S3, the user designates print by using the UI of the CP 3020. Assume here that the image format to be printed is, e.g., a PNG format, and the PD printer 1000 does not cope with this image format. In this case, it is determined in step S41 that image conversion processing by the server 105 is necessary, and the flow advances to step S42. In step S42, the CP 3020 requests the server 105 to convert the PNG format into the EXIF/JPEG format. In addition, if it is determined that the conversion processing takes a long time because the amount of the image data to be format-converted is large, the CP 3020 instructs to store the converted image data in the server 105. In step S43, it is determined whether the instruction to store the image data in the server 105 is issued. If YES in step S43, the flow advances to step S44 to disconnect communication with the PD printer 1000. Whether to store image data in the server 105 can be not only determined on the basis of the data amount but also designated by the user by using the UI, as described with reference to the UI window shown in Fig. 9.

Processing in the server 105 will be described next. The server 105 receives the processing request from the CP 3020 in step S31 and executes the requested

processing in step S32. In step S32, for example, the image data is converted into the EXIF/JPEG format on the basis of the conversion information of the PNG data received from the CP 3020. In step S33, the conversion
5 information received in step S31 contains the instruction to store the converted image file in the database 105a. If YES in step S33, the flow advances to step S35 to store the converted image data in the database 105a, create a URL representing the storage
10 address, and transmit the URL to the CP 3020. The URL is received by the CP 3020 and stored in a RAM 33 in step S45.

If NO in step S33, the flow advances to step S34 to transmit the processed image data to the CP 3020,
15 like the above-described processing shown in Fig. 8. The image data is received by the CP 3020 in step S9, and a print job is created.

Upon receiving the URL in step S45, the CP 3020 establishes communication connection with the PD
20 printer 1000 again in step S46 (Fig. 13). In step S47, a UI capable of designating a print image by the URL is formed and displayed on the display unit 35. Hence, the user can designate print by using the URL in the UI of the CP 3020. When the URL is designated, and a
25 print instruction is input by the user's operation in step S48, the flow advances from step S49 to step S50 to access the server 105 through Internet 101 on the

basis of the URL.

The server 105 reads out the image data designated by the URL from the database 105a in step S51 and transmits the image data to the CP 3020 in step 5 S52.

In step S53, the CP 3020 downloads the image file to be printed. The flow advances to step S9 (Fig. 8) to create the print job to be transmitted to the PD printer 1000 and transmit the print job to the PD 10 printer 1000. If it is determined that the designation is no print designation using a URL, the flow advances to step S54 to execute processing corresponding to the instruction.

As described above, according to the second 15 embodiment, when it is expected that the processing time in the server 105 becomes long, and timeout in the communication occurs between the CP 3020 and the PD printer 1000, the processed image data is temporarily stored in the server 105, and the URL representing the 20 storage address is received. The UI capable of designating the image file is formed and displayed by using the URL in the CP 3020. With this processing, selection of the image to be printed and print instruction can be done by using the UI in the CP 3020.

25 Fig. 14 is a flowchart for explaining data exchange between the CP 3020 and the server 105 according to the second embodiment of the present

invention. Referring to Fig. 14, the CP 3020 and server 105 are connected in the same way as in the above-described first embodiment.

In the second embodiment, the service provided by the server 105 includes image conversion from PNG which is sent from the client to a predetermined address of the server 105 by using an HTTP POST method into JPEG, converted image data saving processing based on a saving request XML script, and conversion from a PNG image file into an EXIF/JPEG image file and saving processing of the image file. The service also includes processing of supplying an XML script for describing a location in which the converted image data has been stored from the server 105 to a predetermined address on the client by using the HTTP POST method. Assume that the CP 3020 has already obtained the IP address and service form of the server 105 by any existing mechanism, as in the above-described first embodiment.

In step S141, the CP 3020 sends, to the server 105, an XML script which describes a desire to convert a PNG image file into an EXIF/JPEG image file and save the image file by using the HTTP POST method. Reference numeral 940 denotes an example of the HTTP POST request. The first and second lines are the same as in 901 in Fig. 10, and a description thereof will be omitted. In "CONTENT-LENGTH" of the third line, the

size of the XML script which describes the desire to convert a PNG image file into an EXIF/JPEG image file and save the image file, which is attached to the HTTP POST request, is described. In "CONTENT-TYPE" of the fourth line, a character string "text/xml" indicating the XML script is described. The XML script which describes the desire of conversion and saving is described from the line after next to "CONTENT-TYPE", i.e., from the sixth line from the top. In addition, "png-jpg-convert-request" of the seventh line indicates that the request is a conversion request from a PNG image file into an EXIF/JPEG image file, and "yes" described in "store" of the eighth line indicates that the CP 3020 wants saving in the server 105.

Upon receiving the XML script in step S151, the server 105 understands in step S152 that the request from the CP 3020 is conversion from a PNG image file into an EXIF/JPEG image file and saving of the image file and notifies the CP 3020 that the HTTP POST request is normally processed. Reference numeral 950 denotes an example of an HTTP POST response which is the same as the above-described OK response.

When the CP 3020 receives the OK response (step S142), the flow advances to step S143 to transmit the PNG image file to be converted and saved to the server 105 by using the HTTP POST method. Reference numeral 941 denotes contents of the HTTP POST request which is

the same as in 902 in Fig. 10, and a description thereof will be omitted.

The server 105 receives the PNG data in step S153 and holds the received PNG image file inside in step 5 S154 (the file is held in "xyz/input/" here, though any other holding format and location can be used). The server 105 notifies the CP 3020 that the HTTP POST request is normally processed (step S155). The example of the HTTP POST response is the same as described 10 above. In step S156, the server 105 converts the held PNG image file into an EXIF/JPEG image file. In step S157, the server 105 saves the converted EXIF/JPEG image file at a predetermined location so as to be accessible from the CP 3020 (the file is held in 15 "xyz/result/" with a file name "abc1/jpg" here. This is because conversion and management of the saved file are done on the basis of the first request from a client name "abc", though any other holding format, location, and management method can be used). In step 20 S158, the server 105 sends an XML script which describes the saving location of the EXIF/JPEG image file to the CP 3020 by using the HTTP POST method. Reference numeral 951 denotes an example of the HTTP request. The POST destination "xyz/result/" described 25 on the first line indicates "the destination of client to be designated to receive an XML script which describes the saving location of an EXIF/JPEG image

file saved in the server", which is defined in the service provided by the server 105. Contents described in the transmission source information "xyz:pn-xyz" of the second line will be described. The address of the print job file as the transmission source is described in "xyz", and a port number to be used by the server 105 as the transmission source in the HTTP POST method is described in "pn-xyz". In "CONTENT-LENGTH" of the third line, the size of the XML script which describes the saving location of the EXIF/JPEG image file is described. In "CONTENT-TYPE" of the fourth line, a character string indicating the XML script is described. The XML script which describes the saving location of the EXIF/JPEG image file is described from the line after next to "CONTENT-TYPE", i.e., from the sixth line from the top. In addition, "png-jpg-convert-result" of the seventh line indicates that the result is a result of the conversion request, and "xyz/result.abcl.jpg" described in "url" of the eighth line indicates the saving location of the converted image data.

Upon receiving the URL in step S145, the CP 3020 obtains the saving location of the EXIF/JPEG image file converted and saved in the server 105 and notifies the server 105 that the HTTP POST request is normally processed in step S146.

From then, the CP 3020 can obtain the image saved

in the server 105 by using an HTTP GET method.

In the second embodiment, HTTP is used as the communication protocol, and the HTTP POST method and HTTP GET method are used. However, the two methods
5 need not always be used. HTTP PUT may be used, and any other protocol may be used.

In the service provided by the server 105 of the second embodiment, a PNG image file is converted into an EXIF/JPEG image file and saved on the basis of a
10 description in an XML script POSTed to a predetermined address, and the CP is notified of the saving location. However, the present invention is not limited to this. The EXIF/JPEG image file to be saved and the saving method may be specified by any other method of, e.g.,
15 simply converting a PNG image file received from the CP 3020, saving the image file, and notifying the CP 3020 of the saving location.

In the service provided by the server 105 of the second embodiment, the saving location is POSTed to a
20 predetermined address on the client. Instead, the CP 3020 may be notified of the saving location of the converted image file by any other method of, e.g., determining the saving location on the basis of a description in a script POSTed from the CP 3020 or
25 notifying the CP 3020 of the saving location as a response to GET executed from the CP 3020 to a predetermined address of the server 105. Image

conversion and saving can be executed any time and may be executed after the image sending request is issued from the CP 3020 to the saving location.

[Third Embodiment]

5 In the first embodiment, when the PNG format can be converted into the EXIF/JPEG format by using the resources of the RAM and ROM of the CP 3020, it may be determined on the basis of the amount of image data whether the target image needs to be manipulated and
10 converted by the server. That is, even when the CP 3020 can manipulate and convert image data, processing of image data with a large size may be impossible from the viewpoint of the resources. As a characteristic feature of this embodiment, a criterion for such a case
15 is defined.

Fig. 15 is a flowchart for explaining processing according to the third embodiment of the present invention. This flowchart is added to the above-described processing flowchart shown in Fig. 8.

20 When an instruction to convert an image of the PNG format into an image of the JPEG format and print the image is input by the UI operation in step S3 in Fig. 8 described above, the flow advances to step S61 to obtain the amount of the image data of the PNG
25 format. In step S62, it is determined whether the amount of image data is equal to or larger than a predetermined amount. If YES in step S62, it is

determined that processing by a server 105 is appropriate, and the flow advances to step S5 to request the server 105 to execute image format conversion processing. If NO in step S62, it is
5 determined that format conversion processing by a CP 3020 is possible, and the flow advances to step S63 to execute image conversion processing from the PNG format into the JPEG format. The flow advances to step S6 to create a print job. In step S7, the print job is
10 transmitted from the CP 3020 to the PD printer 1000, and print processing based on the print job is instructed by the CP 3020.

As described above, according to this embodiment, when the server 105 is caused to execute image
15 processing in the PD printer 1000 or CP 3020, even an image format which is not compatible with the PD printer can be printed. Hence, the application range of the image format which can be handled by the CP 3020 as an image to be printed can be widened.

20 According to this embodiment, when print is requested for a print function incompatible with the printer, manipulation and conversion are executed by the server so that a variety of image forms can be provided.

25 Further, according to this embodiment, a print image can be saved in the server, and a target image can be downloaded from the server to the CP and printed

using a printer.

[Other Embodiment]

The object of the present invention is achieved even by supplying a storage medium which records
5 software program codes to implement the functions of the above-described embodiments to a system or apparatus and causing the computer (or CPU or MPU) of the system or apparatus to read out and execute the program codes stored in the storage medium, as
10 described above. In this case, the program codes read out from the storage medium implement the functions of the above-described embodiments by themselves, and the storage medium which stores the program codes constitutes the present invention. As the storage
15 medium to supply the program codes, for example, a floppy (registered trademark) disk, hard disk, optical disk, magneto-optical disk, CD-ROM, CD-R, magnetic tape, nonvolatile memory card, or ROM can be used.

The functions of the above-described embodiments
20 are implemented not only when the readout program codes are executed by the computer but also when the OS (Operating System) running on the computer performs part or all of actual processing on the basis of the instructions of the program codes.

25 The functions of the above-described embodiments are also implemented when the program codes read out from the storage medium are written in the memory of a

function expansion board inserted into the computer or
a function expansion unit connected to the computer,
and the CPU of the function expansion board or function
expansion unit performs part or all of actual
5 processing on the basis of the instructions of the
program codes.

The present invention is not limited to the above
embodiment, and various changes and modifications can
be made thereto within the spirit and scope of the
10 present invention. Therefore, to apprise the public of
the scope of the present invention, the following
claims are made.

CLAIM OF PRIORITY

15 This application claims priority from Japanese
Patent Application No. 2004-249020 filed on August 27,
2004, the entire contents of which are hereby
incorporated by reference herein.

CLAIMS

1. A print system for causing a printer to print an image on the basis of image data supplied from a portable communication apparatus by direct communication between the portable communication apparatus and the printer, comprising:

obtaining means for obtaining a print function of the printer;

input means for inputting print conditions; means for, in a case where the print conditions input by said input means are not within the print function of the printer obtained by said obtaining means, causing the portable communication apparatus to request a server to execute corresponding processing; and

print control means for controlling to cause the printer to print the image on the basis of a result processed by the server.

2. A print system for causing a printer to print an image on the basis of image data supplied from a portable communication apparatus by direct communication between the portable communication apparatus and the printer, comprising:

obtaining means for obtaining a print function of the printer;

input means for inputting print conditions;

determination means for determining whether an amount of image data, which is instructed to be printed using the print conditions, is not less than a

5 predetermined amount;

control means for, in a case where said determination means determines that the amount of image data is not less than the predetermined amount, causing the portable communication apparatus to request a

10 server to execute corresponding processing, and in a case where said determination means determines that the amount of image data is less than the predetermined amount, causing the portable communication apparatus to execute the corresponding processing; and

15 print control means for controlling to cause the printer to print the image on the basis of a result processed by one of the server and the portable communication apparatus.

20 3. The print system according to claim 1, wherein the print conditions include image format conversion.

4. The print system according to claim 1, wherein the print conditions include layout print.

25

5. The print system according to claim 1, wherein the server is connected to a communication network, and

the system further comprising:

conversion means for converting image data
received from the portable communication apparatus
through the communication network in accordance with
5 the print conditions, and

transmission means for transmitting the image
data converted by said conversion means to the portable
communication apparatus through the communication
network.

10

6. The print system according to claim 1, wherein
the portable communication apparatus comprising:

means for instructing to store, in the server,
the result processed by the server, and

15

reception means for receiving, from the server, a
URL of the result stored in the server.

7. The print system according to claim 1, further
comprising:

20

second obtaining means for obtaining a processing
function of the server, and

setting means for setting print conditions
inputtable by said input means on the basis of the
print function of the printer and the processing
25 function of the server obtained by said second
obtaining means.

8. The print system according to claim 7, wherein said setting means sets the print conditions by selecting one of the processing function of the server and the print function of the printer.

5

9. The print system according to claim 7, wherein said setting means sets the print conditions by combining the processing function of the server and the print function of the printer.

10

10. A portable communication apparatus for supplying image data to a printer and causing the printer to print the image data by direct communication with the printer, comprising:

15 obtaining means for obtaining a print function of the printer;

input means for inputting print conditions;

means for, in a case where the print conditions input by said input means are not within the print function of the printer obtained by said obtaining means, requesting, through a communication network, a server to execute corresponding processing; and

20 print control means for controlling to cause the printer to print the image on the basis of a result processed by the server.

25

11. A portable communication apparatus for supplying

image data to a printer and causing the printer to print the image data by direct communication with the printer, comprising:

obtaining means for obtaining a print function of
5 the printer;

input means for inputting print conditions;

determination means for determining whether an amount of image data, which is instructed to be printed using the print conditions, is not less than a
10 predetermined amount;

control means for, in a case where said determination means determines that the amount of image data is not less than the predetermined amount, requesting, through a communication network, a server
15 to execute corresponding processing, and in a case where said determination means determines that the amount of image data is less than the predetermined amount, executing the corresponding processing; and

print control means for controlling to cause the
20 printer to print the image on the basis of a result processed by one of the server and said control means.

12. The apparatus according to claim 10, wherein the print conditions include image format conversion.

25

13. The apparatus according to claim 10, wherein the print conditions include layout print.

14. The apparatus according to claim 10, further comprising instruction means for instructing the server to store the processed image data.

5

15. The apparatus according to claim 14, further comprising:

reception means for receiving a URL from the server,

10 obtaining means for obtaining the image data to be printed by the printer by using the URL received by said reception means.

16. The apparatus according to claim 10, further

15 comprising:

second obtaining means for obtaining a processing function of the server, and

setting means for setting print conditions inputtable by said input means on the basis of the
20 print function of the printer and the processing function of the server obtained by said second obtaining means.

17. The apparatus according to claim 16, wherein said

25 setting means sets the print conditions by selecting one of the processing function of the server and the print function of the printer.

18. The apparatus according to claim 16, wherein said setting means sets the print conditions by combining the processing function of the server and the print
5 function of the printer.

19. A print control method of causing a printer to print an image on the basis of image data supplied from a portable communication apparatus by direct
10 communication between the portable communication apparatus and the printer, comprising:

an obtaining step of obtaining a print function of the printer;

an input step of inputting print conditions;

15 a step of, in a case where the print conditions input in said input step are not within the print function of the printer obtained in said obtaining step, causing the portable communication apparatus to request a server to execute corresponding processing;
20 and

a print control step of controlling to cause the printer to print the image on the basis of a result processed by the server.

25 20. A print control method of causing a printer to print an image on the basis of image data supplied from a portable communication apparatus by direct

communication between the portable communication apparatus and the printer, comprising:

an obtaining step of obtaining a print function of the printer;

5 an input step of inputting print conditions;

a determination step of determining whether an amount of image data, which is instructed to be printed using the print conditions, is not less than a predetermined amount;

10 a control step of, in a case where it is determined in said determination step that the amount of image data is not less than the predetermined amount, causing the portable communication apparatus to request a server to execute corresponding processing,
15 and in a case where it is determined in said determination step that the amount of image data is less than the predetermined amount, causing the portable communication apparatus to execute the corresponding processing; and

20 a print control step of controlling to cause the printer to print the image on the basis of a result processed by one of the server and the portable communication apparatus.

25 21. The print control method according to claim 19, wherein the print conditions include image format conversion.

22. The print control method according to claim 19,
wherein the print conditions include layout print.

5 23. The print control method according to claim 19,
wherein the server is connected to a communication
network, and

the method further comprises;

a conversion step of converting image data
10 received from the portable communication apparatus
through the communication network in accordance with
the print conditions, and

a transmission step of transmitting the image
data converted in said conversion step to the portable
15 communication apparatus through the communication
network.

24. The print control method according to claim 19,
further comprising:

20 a step of instructing to store, in the server,
the result processed by the server, and

a reception step of receiving, from the server, a
URL of the result stored in the server.

25 25. The print control method according to claim 19,
further comprising:

a second obtaining step of obtaining a processing

function of the server, and

a setting step of setting print conditions
inputtable in said input step on the basis of the print
function of the printer and the processing function of
5 the server obtained in said second obtaining step.

26. The print control method according to claim 25,
wherein in said setting step, the print conditions are
set by selecting one of the processing function of the
10 server and the print function of the printer.

27. The print control method according to claim 25,
wherein in said setting step, the print conditions are
set by combining the processing function of the server
15 and the print function of the printer.

28. A control method of a portable communication
apparatus for supplying image data to a printer and
causing the printer to print the image data by direct
20 communication with the printer, comprising:

an obtaining step of obtaining a print function
of the printer;

an input step of inputting print conditions;

a step of, in a case where the print conditions
25 input in said input step are not within the print
function of the printer obtained in said obtaining
step, requesting, through a communication network, a

server to execute corresponding processing; and

a print control step of controlling to cause the printer to print the image on the basis of a result processed by the server.

5

29. A control method of a portable communication apparatus for supplying image data to a printer and causing the printer to print the image data by direct communication with the printer, comprising:

10 an obtaining step of obtaining a print function of the printer;

an input step of inputting print conditions;

a determination step of determining whether an amount of image data, which is instructed to be printed using the print conditions, is not less than a predetermined amount;

a control step of, in a case where it is determined in said determination step that the amount of image data is not less than the predetermined amount, requesting, through a communication network, a server to execute corresponding processing, and in a case where it is determined in said determination step that the amount of image data is less than the predetermined amount, executing the corresponding processing; and

a print control step of controlling to cause the printer to print the image on the basis of a result

processed by the server or in said control step.

30. The control method according to claim 28, wherein the print conditions include image format conversion.

5

31. The control method according to claim 28, wherein the print conditions include layout print.

32. The control method according to claim 28, further comprising an instruction step of instructing the server to store the processed image data.

33. The control method according to claim 28, further comprising:

15 a reception step of receiving a URL from the server,

an obtaining step of obtaining the image data to be printed by the printer by using the URL received in said reception step.

20

34. The control method according to claim 28, further comprising:

a second obtaining step of obtaining a processing function of the server, and

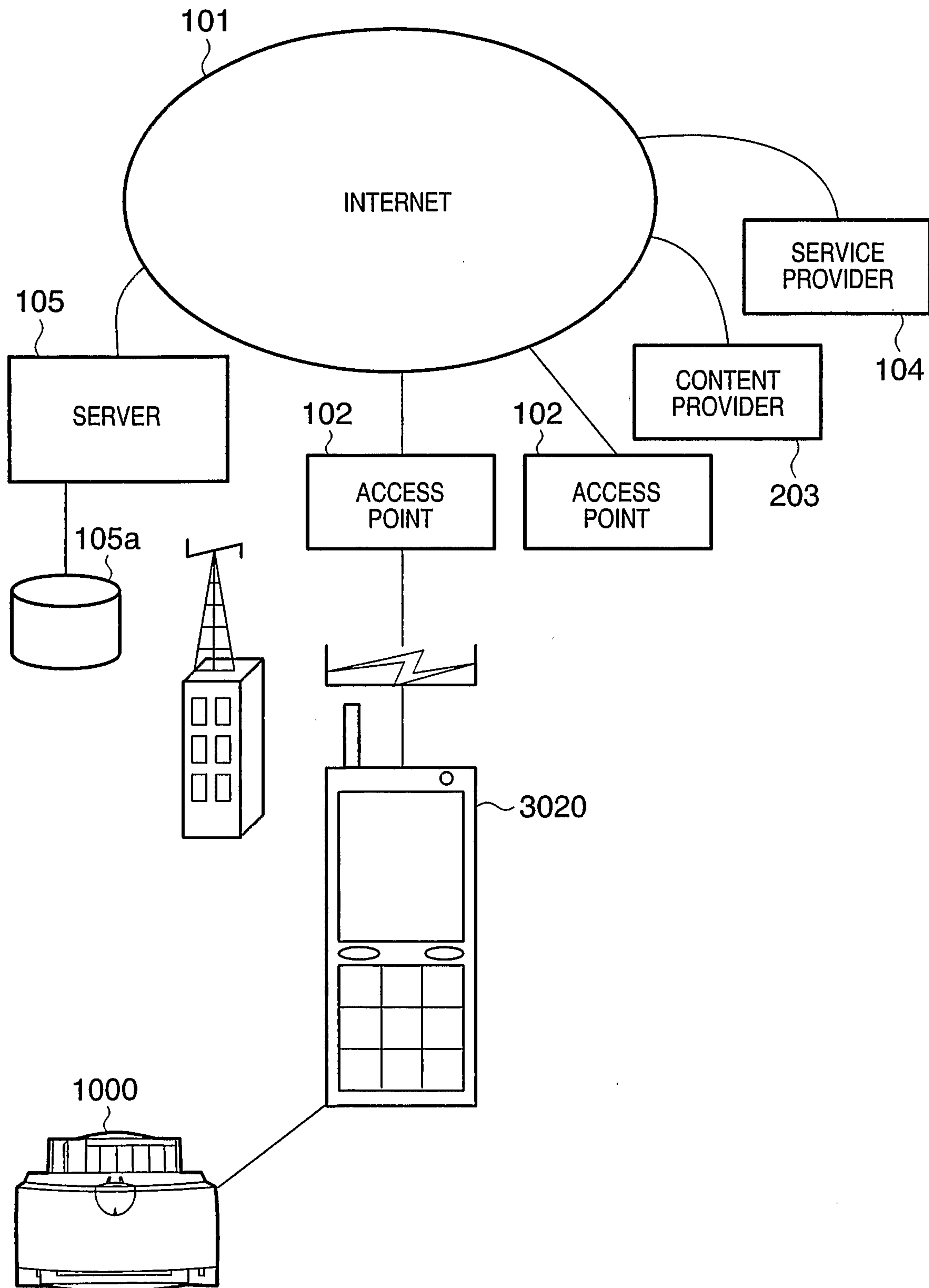
25 a setting step of setting print conditions inputtable in said input step on the basis of the print function of the printer and the processing function of

the server obtained in said second obtaining step.

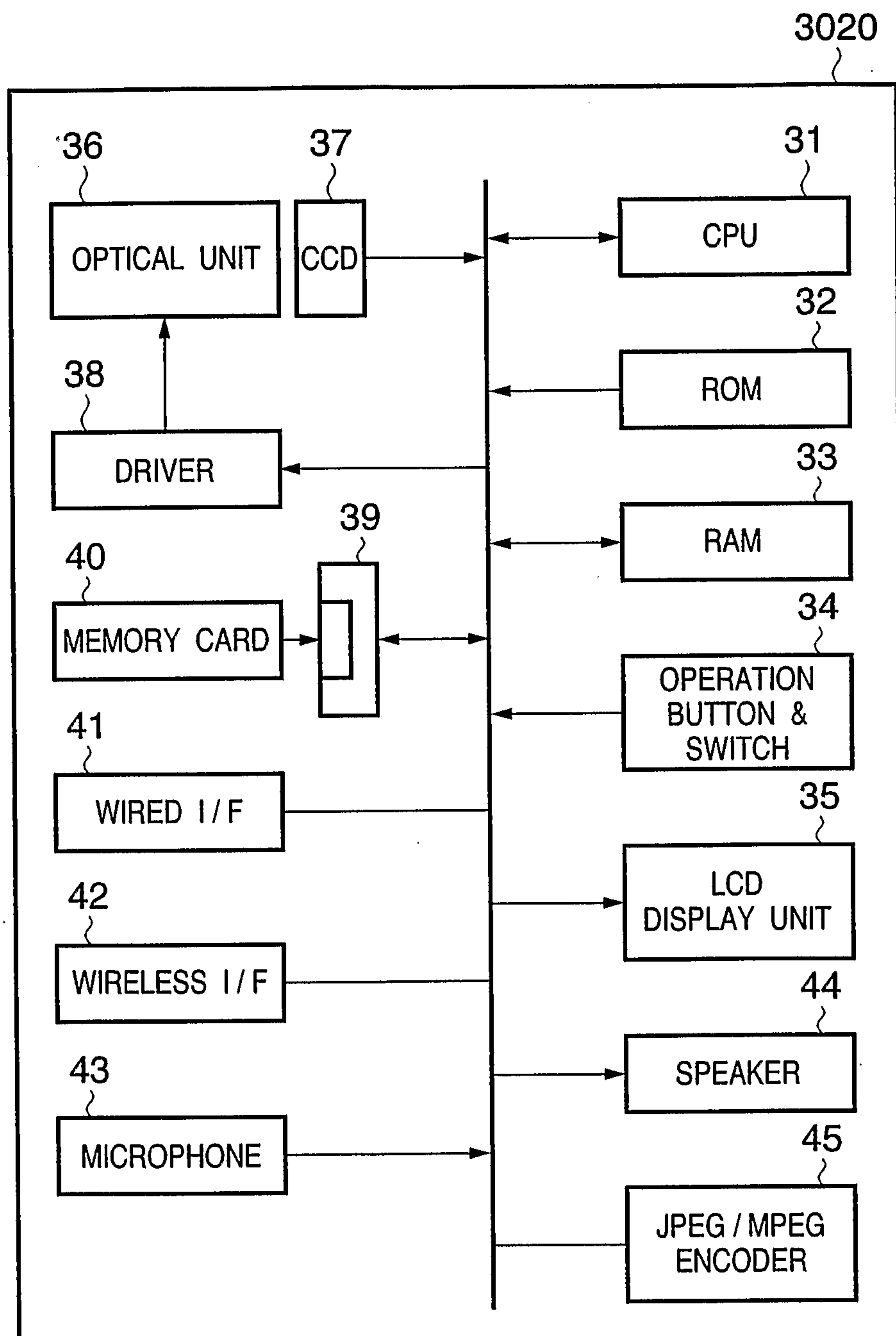
35. The control method according to claim 34, wherein
in said setting step, the print conditions are set by
5 selecting one of the processing function of the server
and the print function of the printer.

36. The control method according to claim 34, wherein
in said setting step, the print conditions are set by
10 combining the processing function of the server and the
print function of the printer.

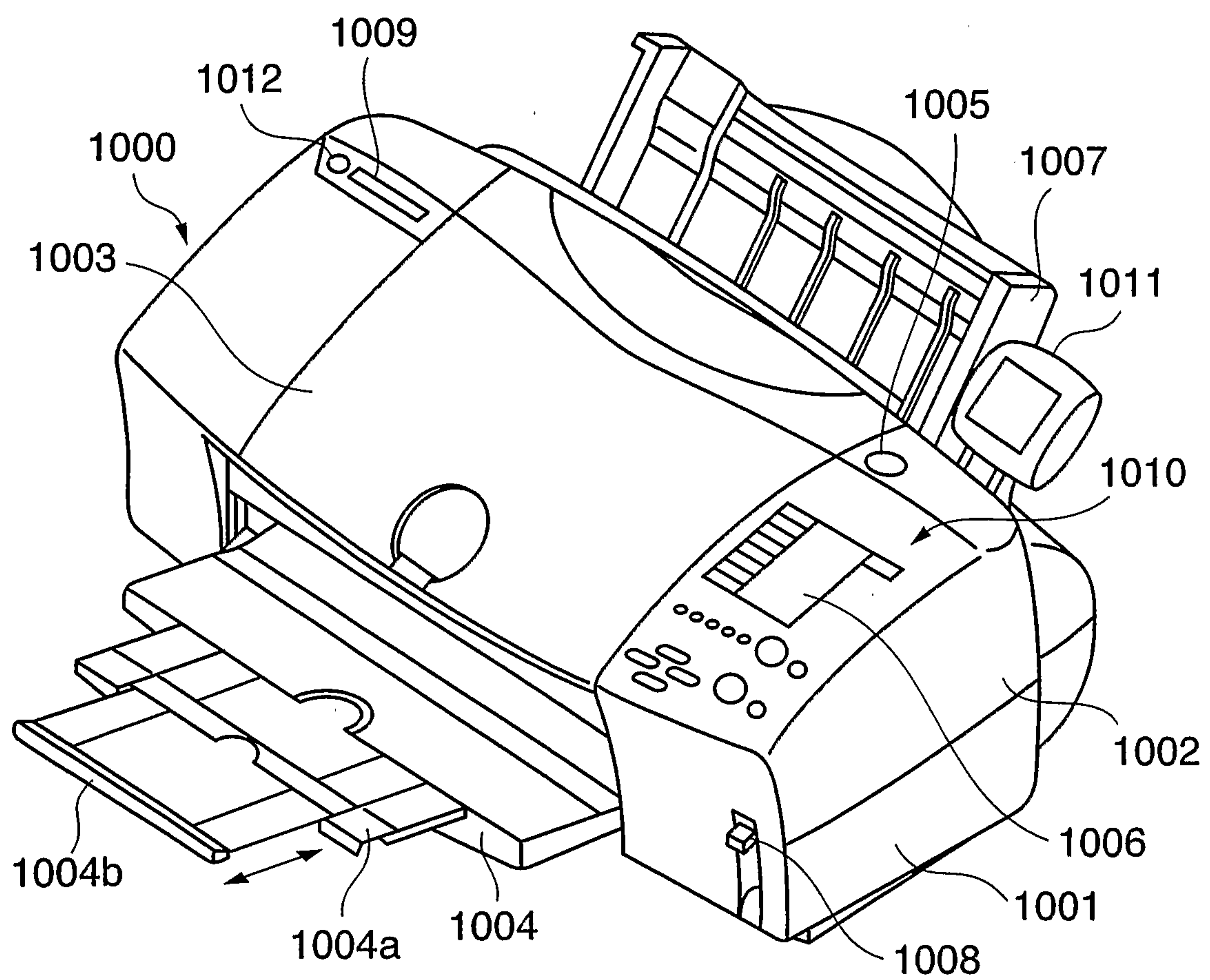
1/16

FIG. 1

2/16

FIG. 2

3/16

FIG. 3

4/16

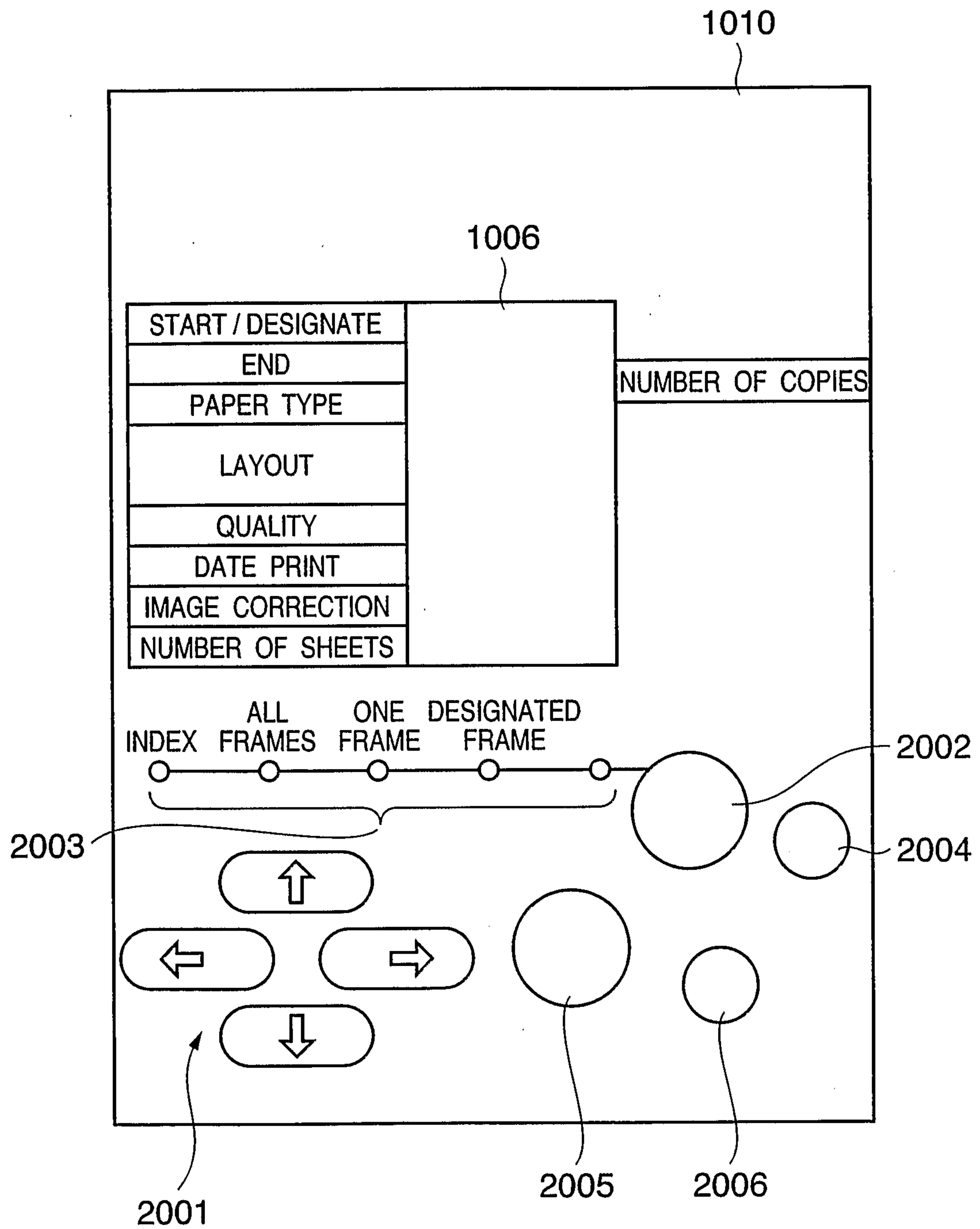
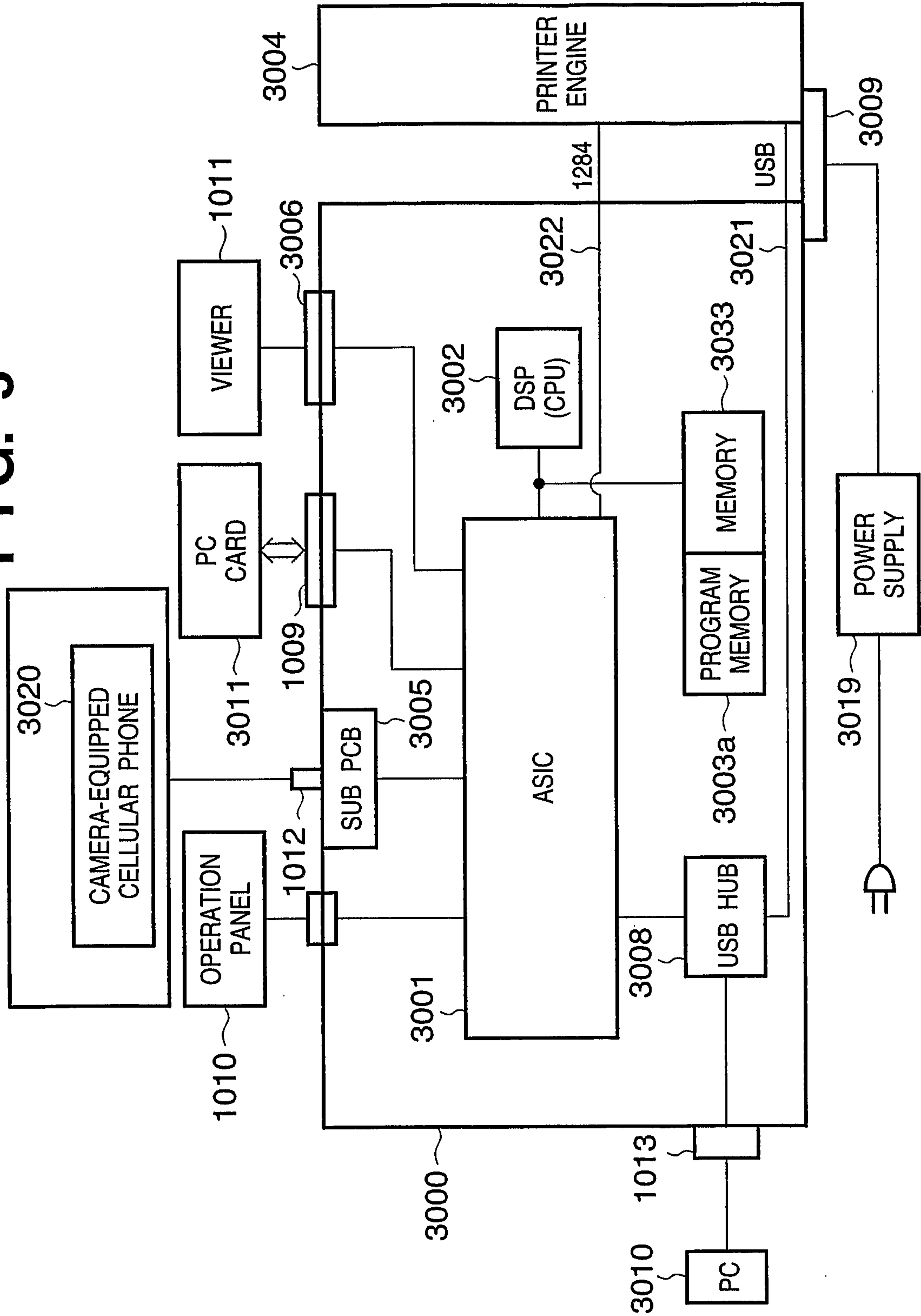
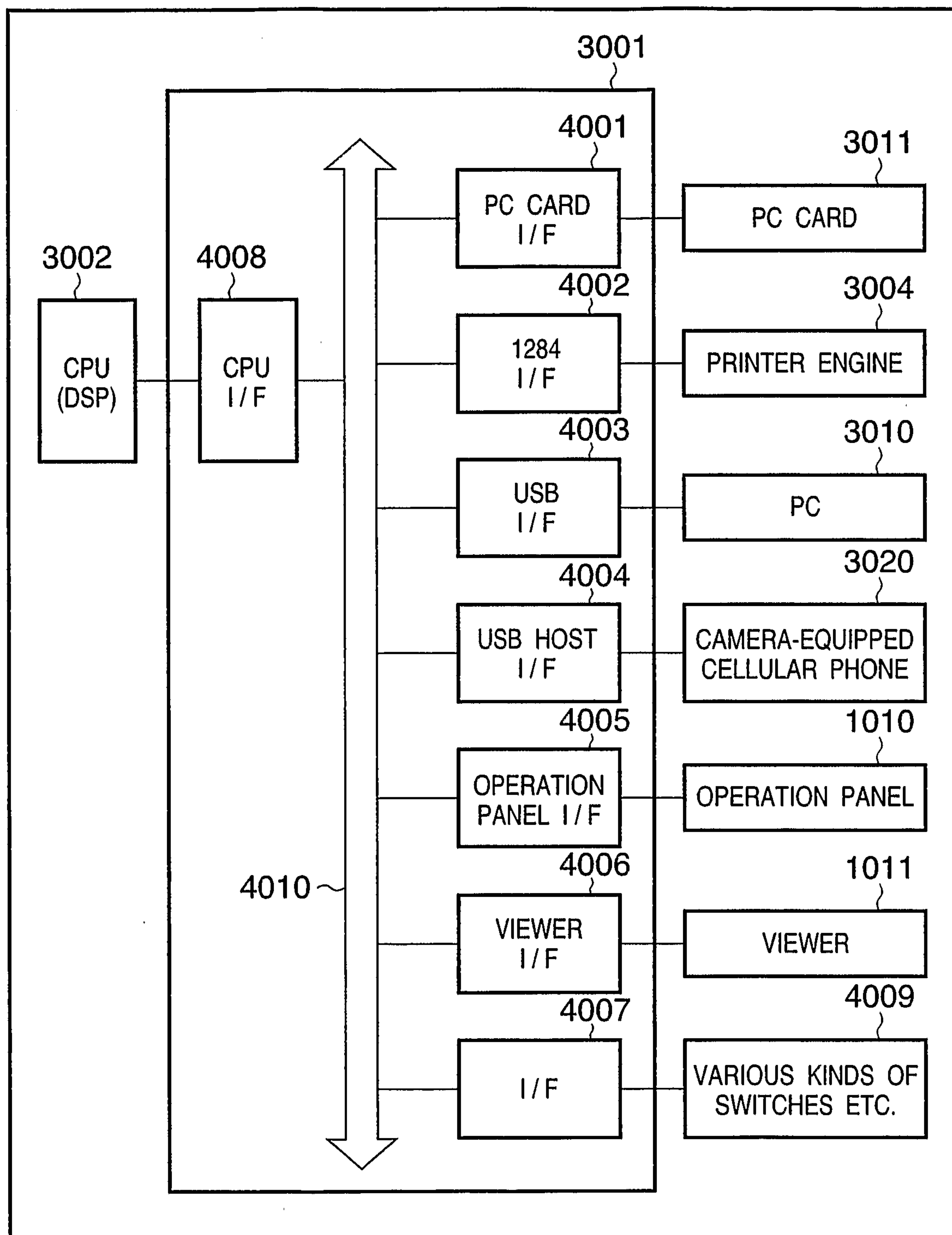
FIG. 4

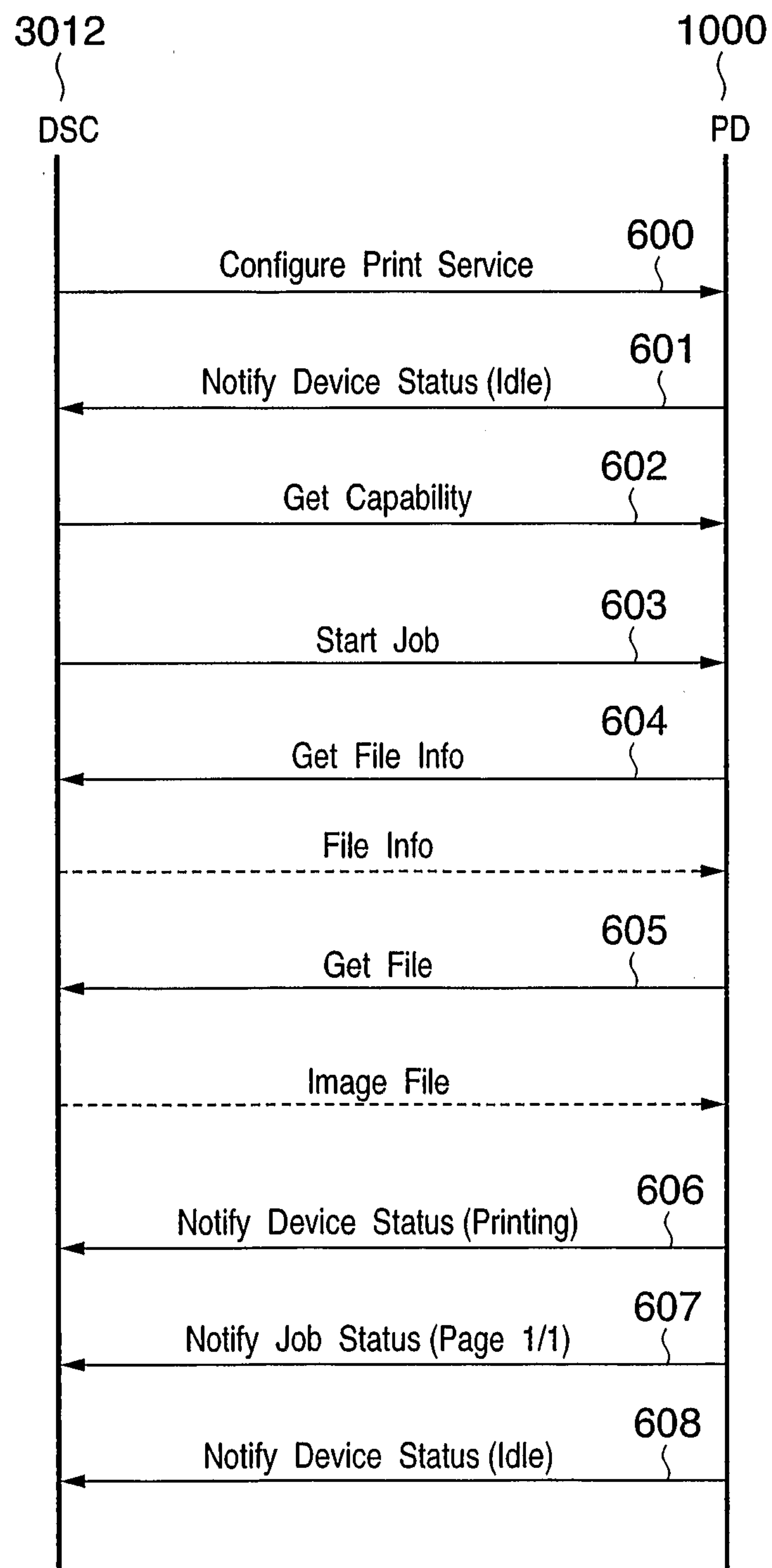
FIG. 5

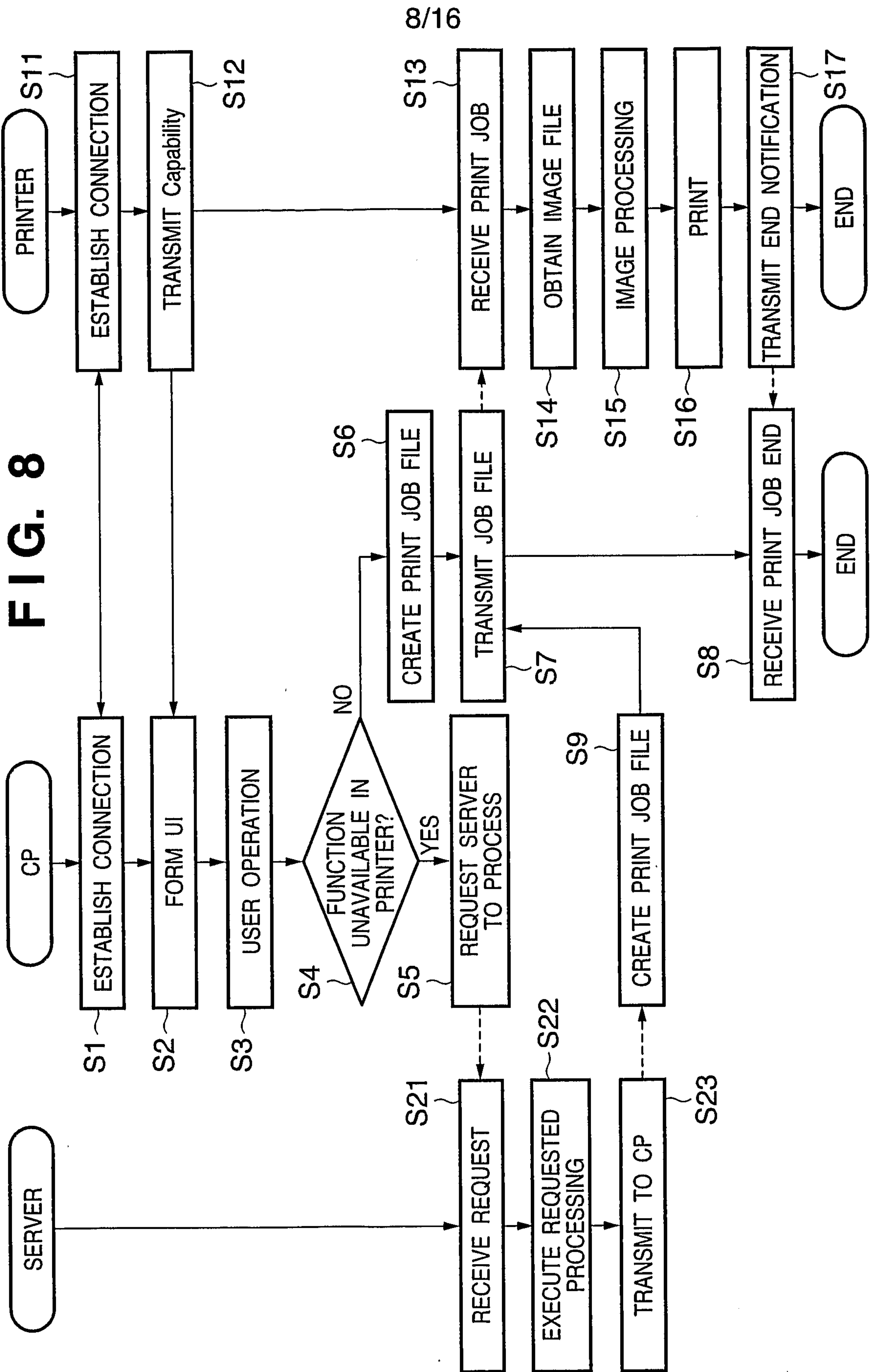


6/16

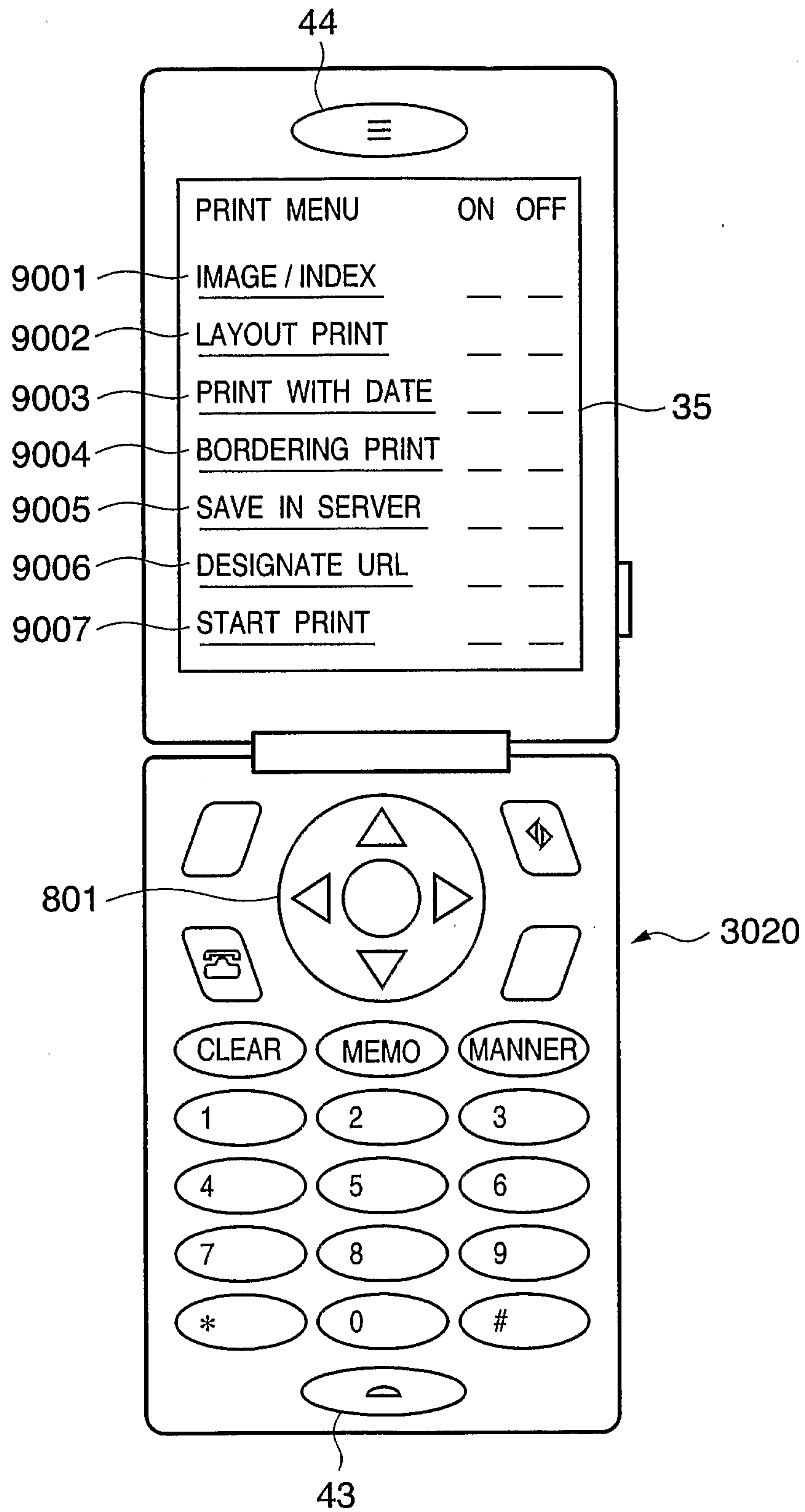
FIG. 6

7/16

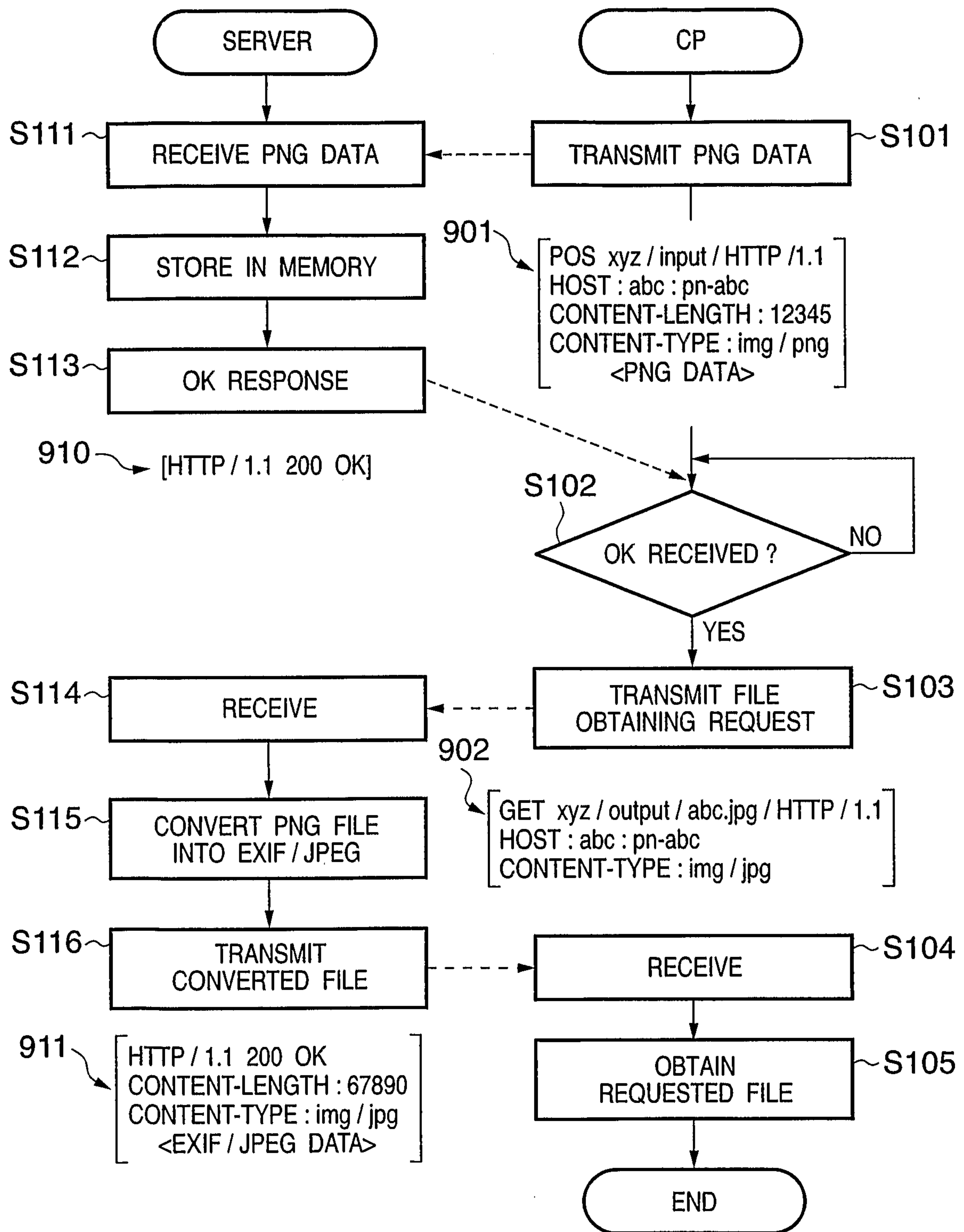
FIG. 7



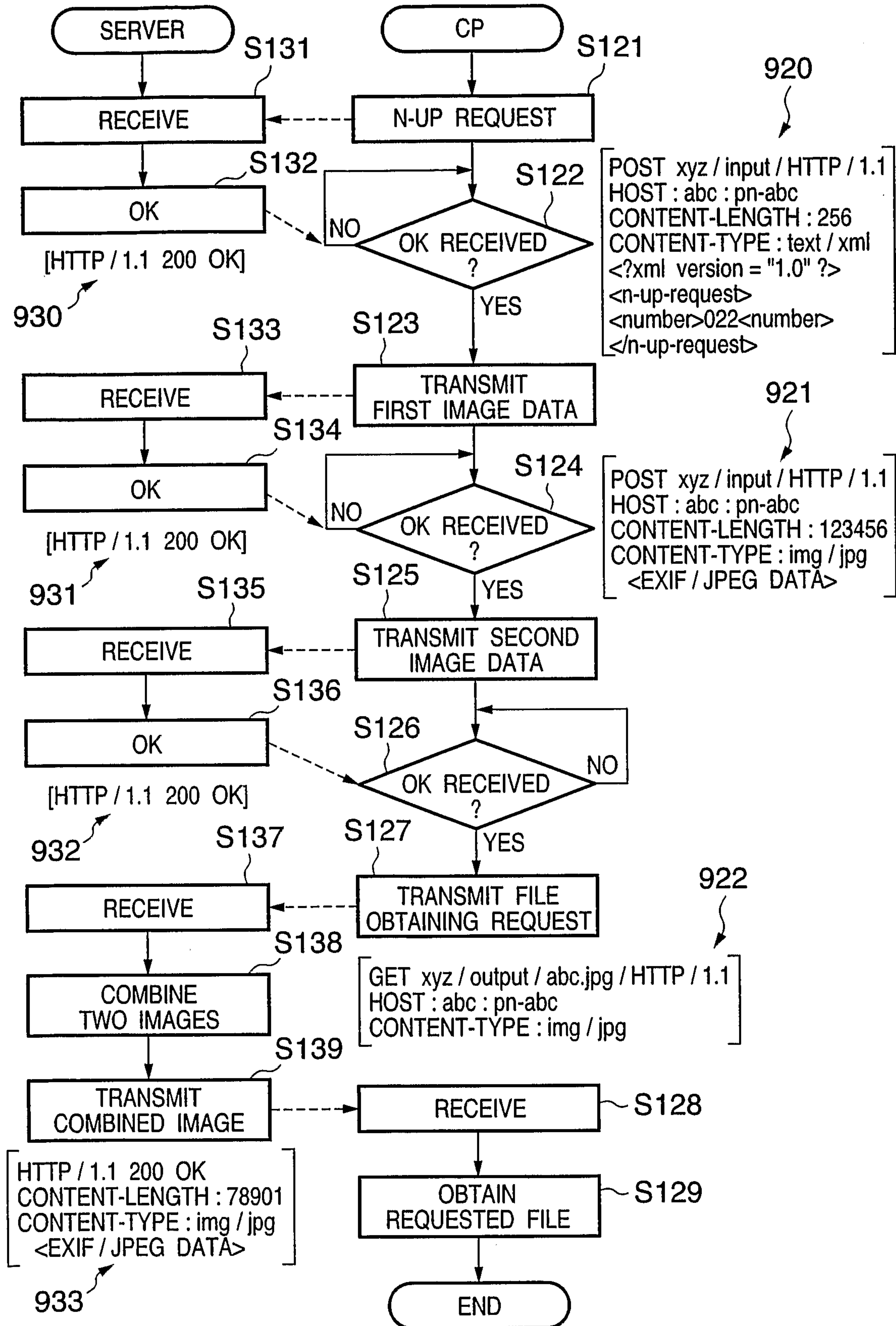
9/16

FIG. 9

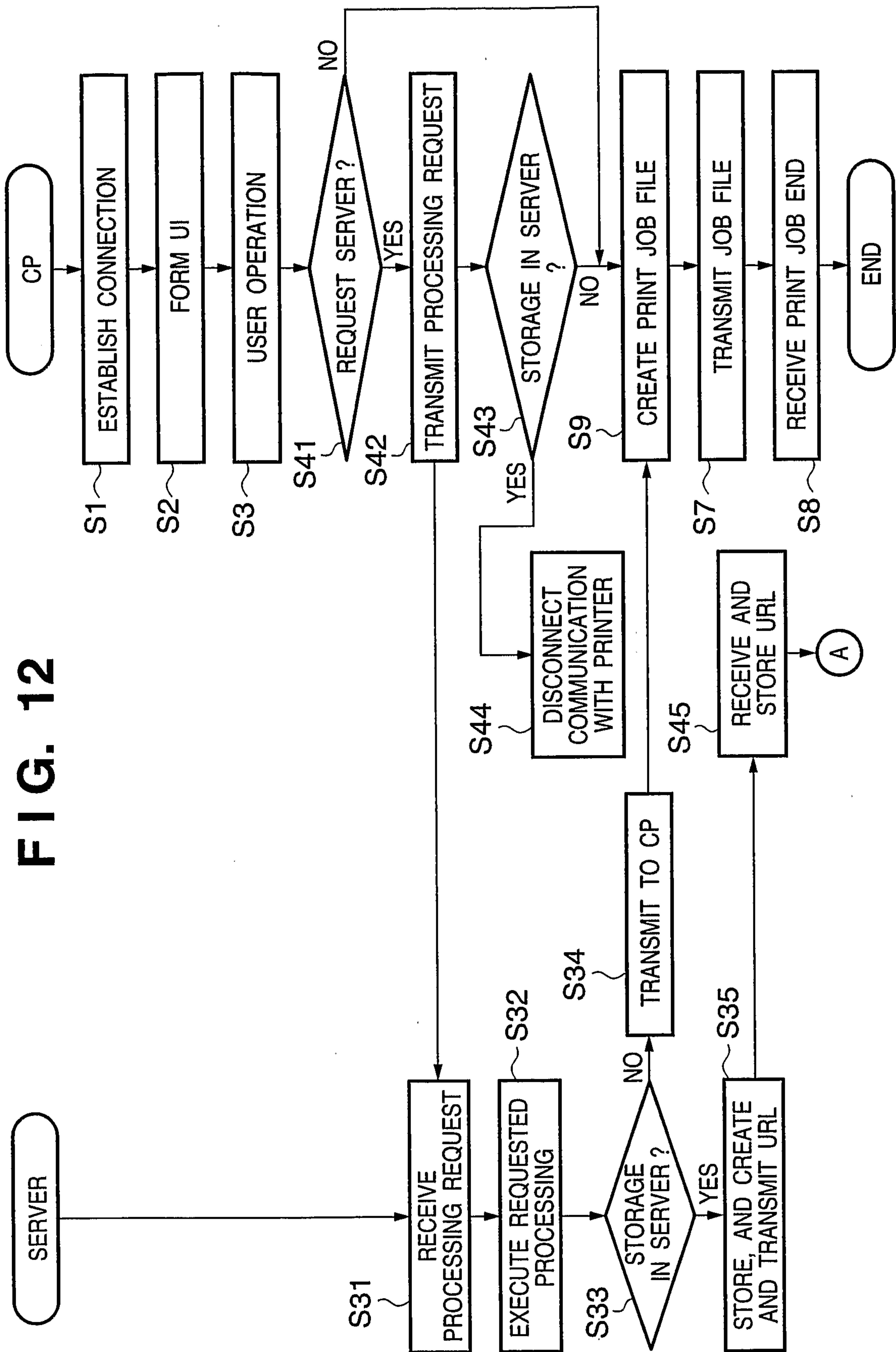
10/16

FIG. 10

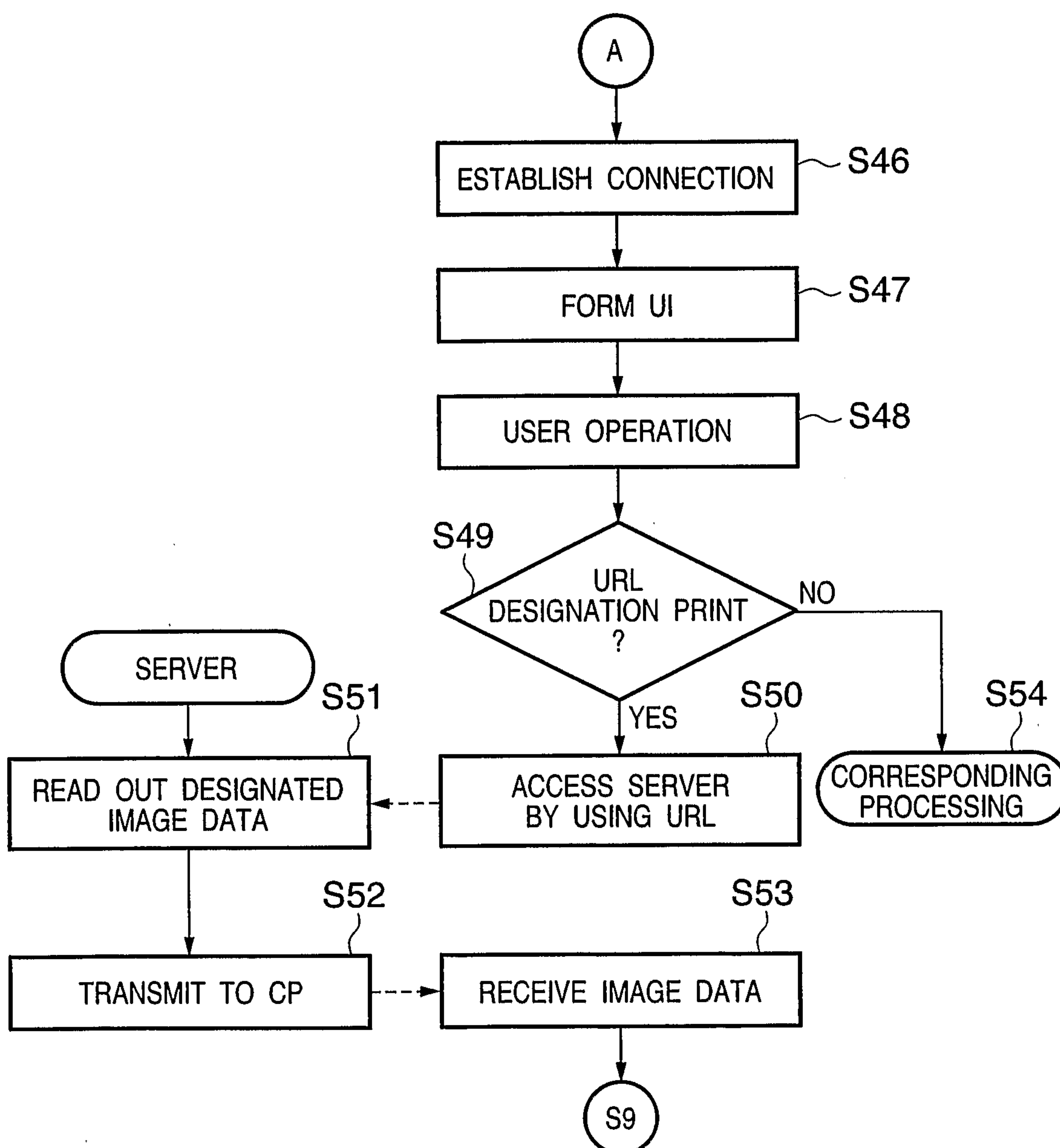
11/16
FIG. 11



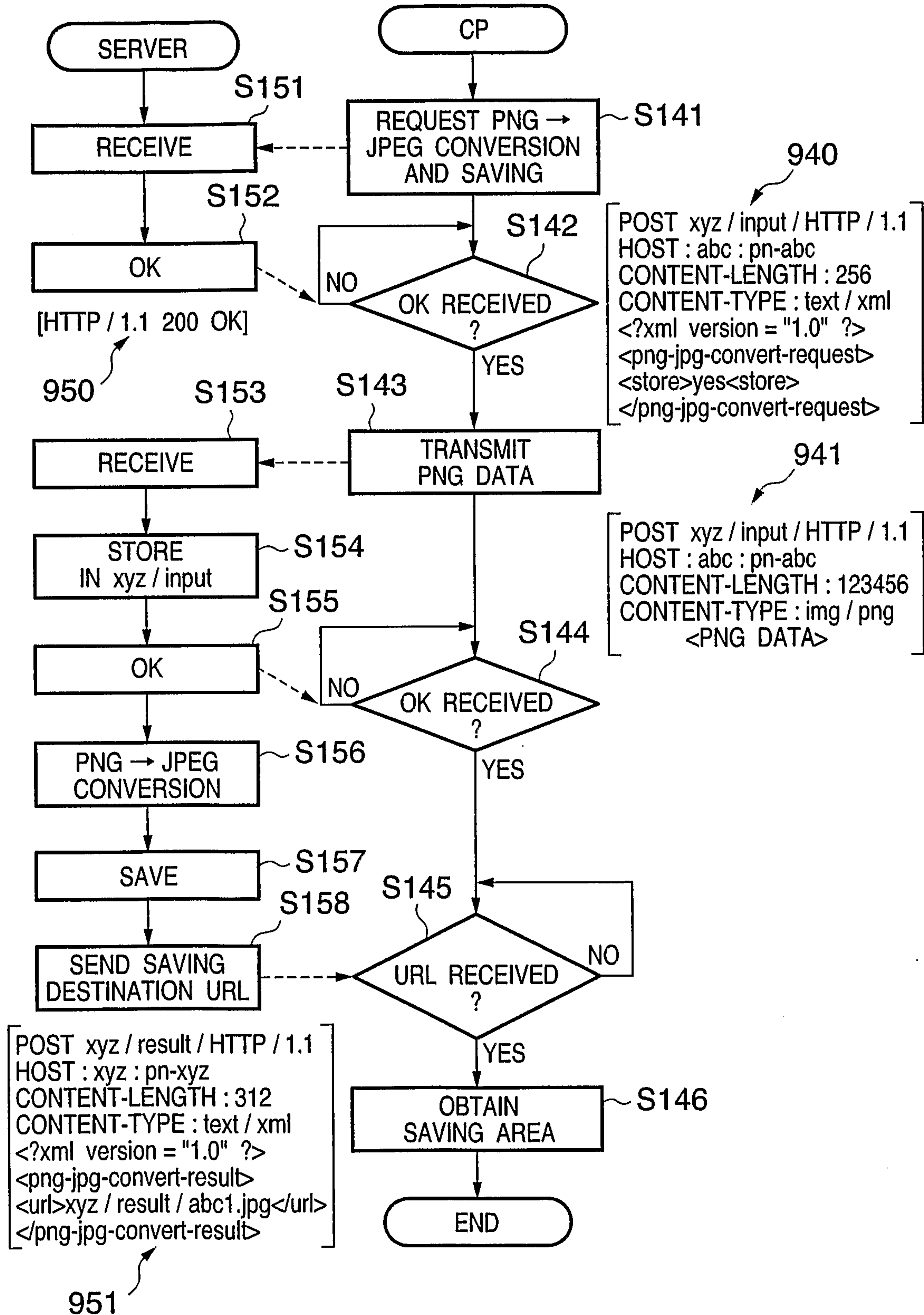
12/16



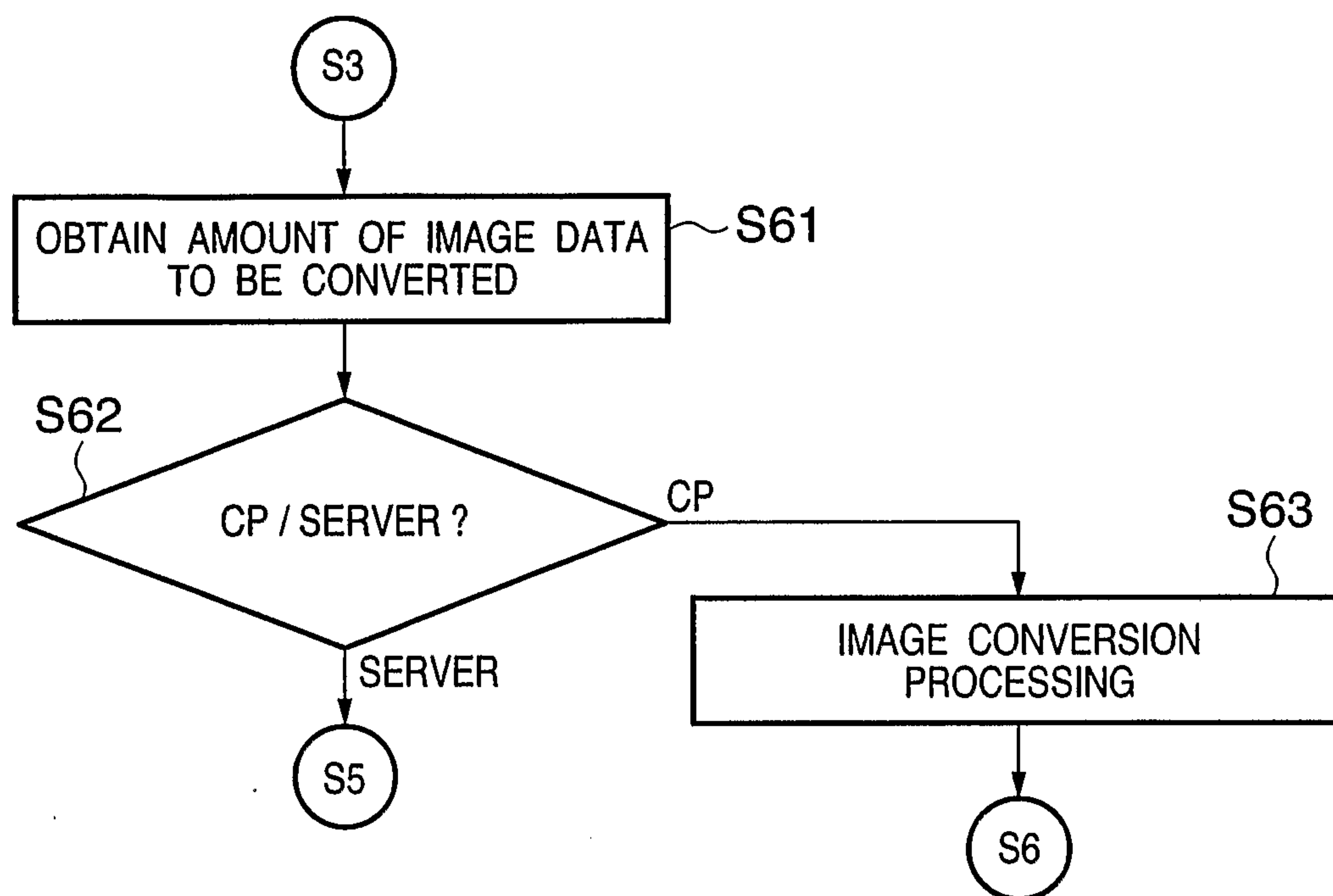
13/16

FIG. 13

14/16

FIG. 14

15/16

FIG. 15

16/16

FIG. 16