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(54) **COMMUNICATION EQUIPMENT COMMUNICATION ROUTE SELECTION METHOD AND COMPUTER PROGRAM PRODUCT IN MEMORY FOR SELECTING A COMMUNICATION ROUTE**

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(57) **ABSTRACT**

ABSTRACT OF THE DISCLOSURE A communication equipment having multiple communication functions, a method of selecting a communication route among multiple communication routes that are available between the sending equipment and receiving equipment, and a computer program product in memory for implementing the communication route selecting process. In route selection mode, a list of communication routes that are available between the sending equipment and receiving equipment is produced and displayed. The user selects a route and associated communication function on the displayed list, and proceeds to communication.

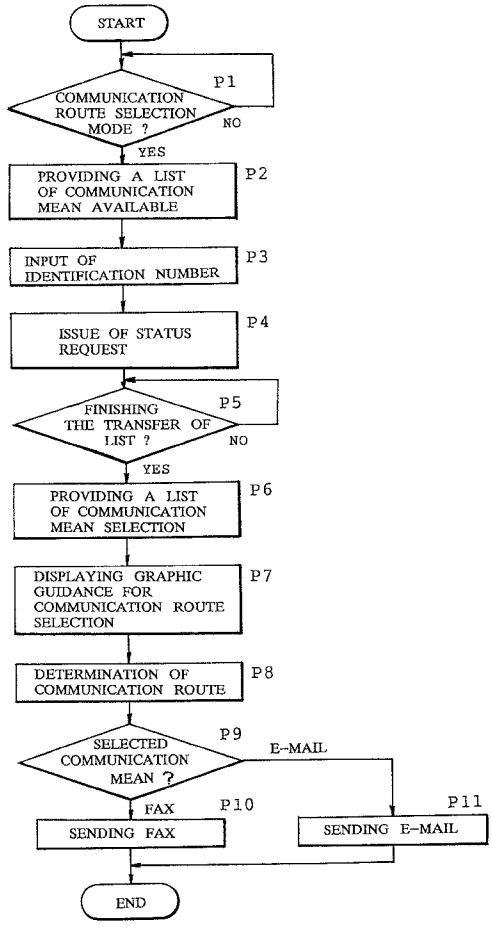


Fig. 1

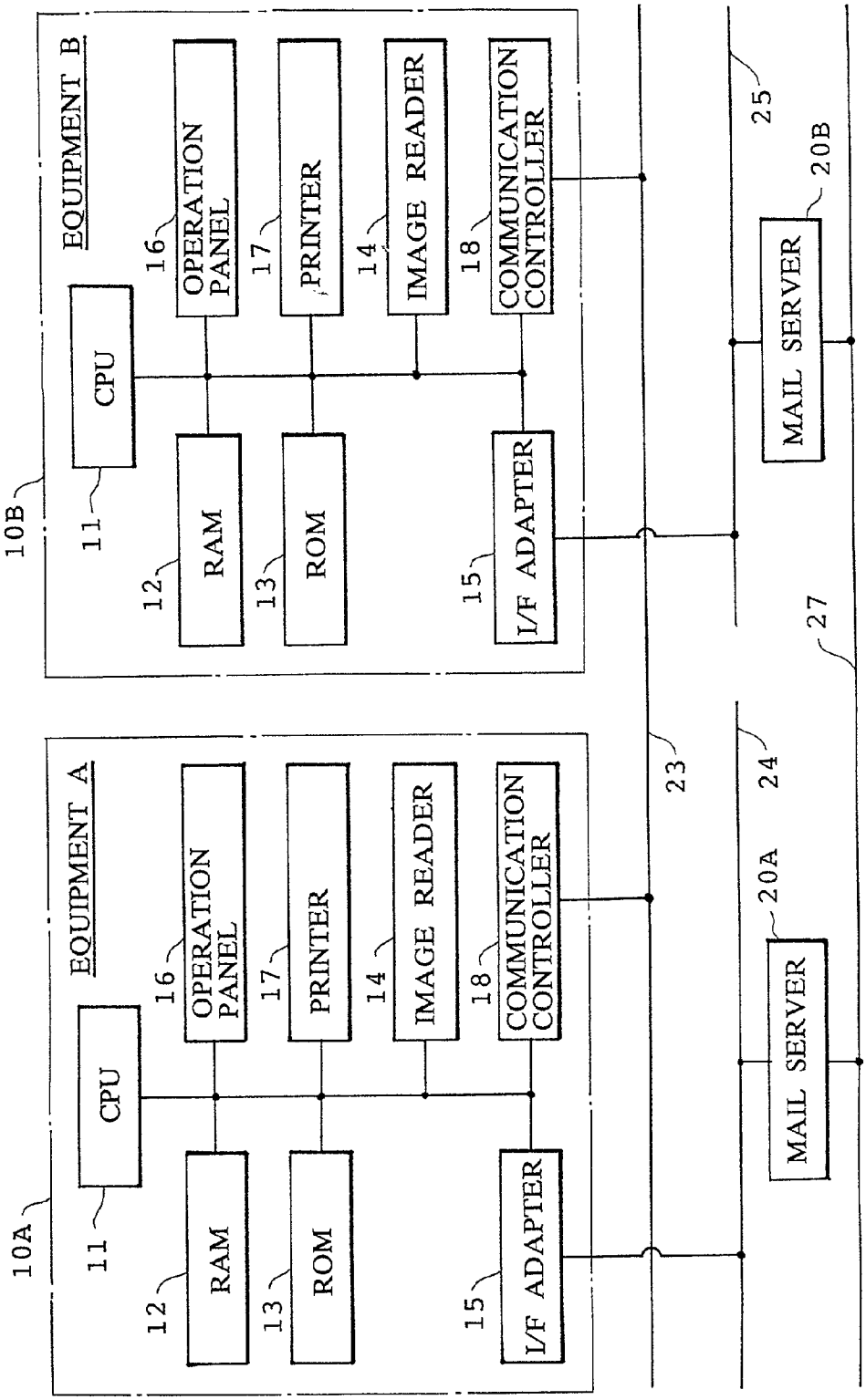

EQUIPMENT A
EQUIPMENT B
10A
10B
CPU
11
RAM
12
ROM
13
IMAGE READER
14
I/F ADAPTER
15
OPERATION PANEL
16
PRINTER
17
COMMUNICATION CONTROLLER
18
MAIL SERVER
20A
20B
23
24
25
27

Fig. 2

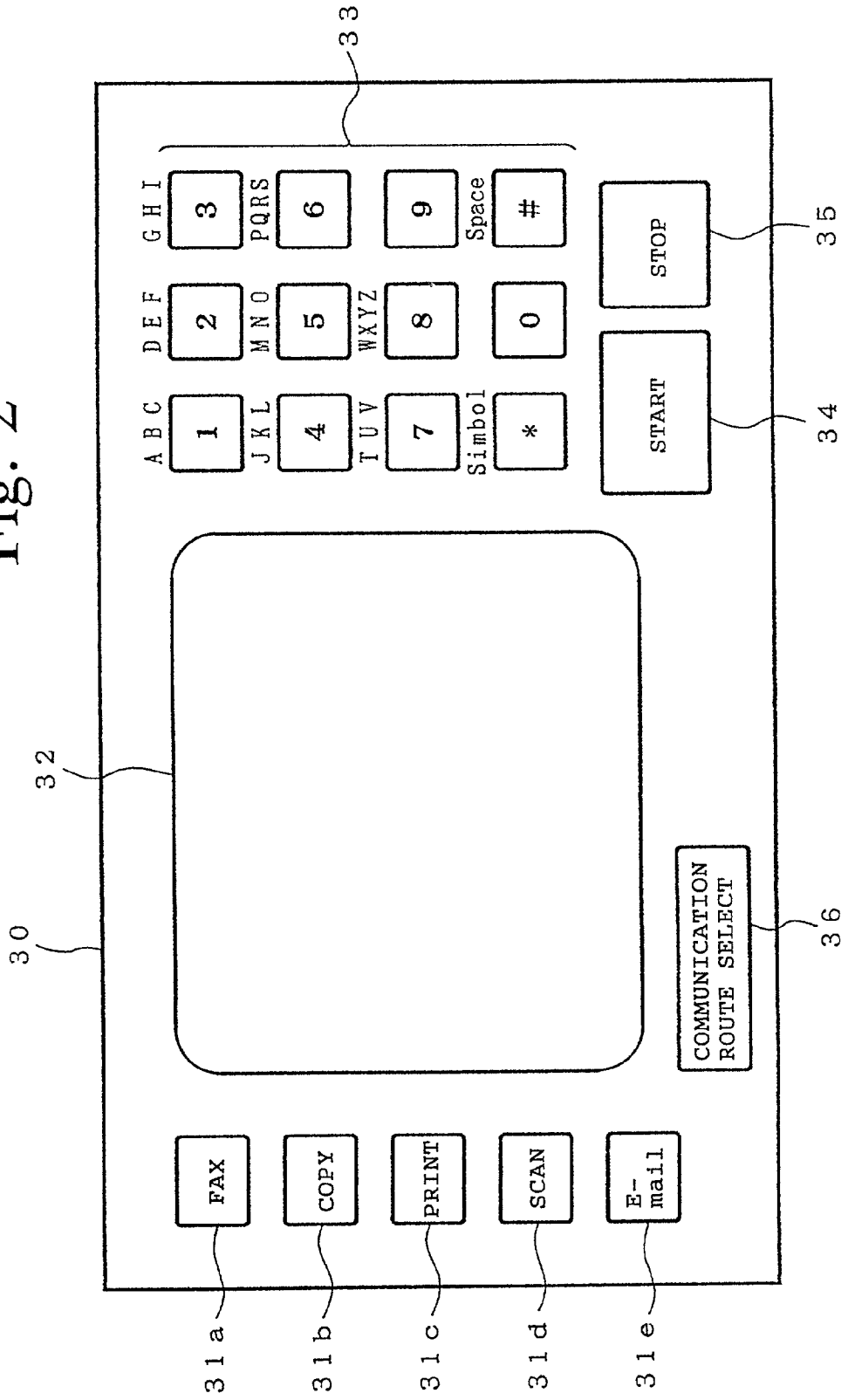

33
ABC 1
DEF 2
GHI 3
JKL 4
MNO 5
PQRS 6
TUV 7
WXYZ 8
9
Simbol *
0
Space #
STOP
START
35
34
32
30
COMMUNICATION ROUTE SELECT
36
FAX
COPY
PRINT
SCAN
E-mail
31a
31b
31c
31d
31e

Fig. 3(a)

EQUIPMENT	COMMUNICATION MANNER	DESIGNATION DATA
RECEIVING EQUIPMENT	FAX(T30)	03-12312
	NETWORK(E-MAIL)	FAX.com.jp
	NETWORK(PRINT)	IP150.16.00

Fig. 3(b)

EQUIPMENT	COMMUNICATION MANNER	DESIGNATION DATA
SENDING EQUIPMENT	FAX(T30)	RECEIVING SIDE PHONE NUMBER
	NETWORK(E-MAIL)	RECEIVING SIDE E-MAIL ADDRESS

Fig. 3(c)

EQUIPMENT	COMMUNICATION MANNER	DESIGNATION DATA
SENDING EQUIPMENT	FAX(T30)	03-12312
	NETWORK(E-MAIL)	FAX.com.jp

Fig. 4

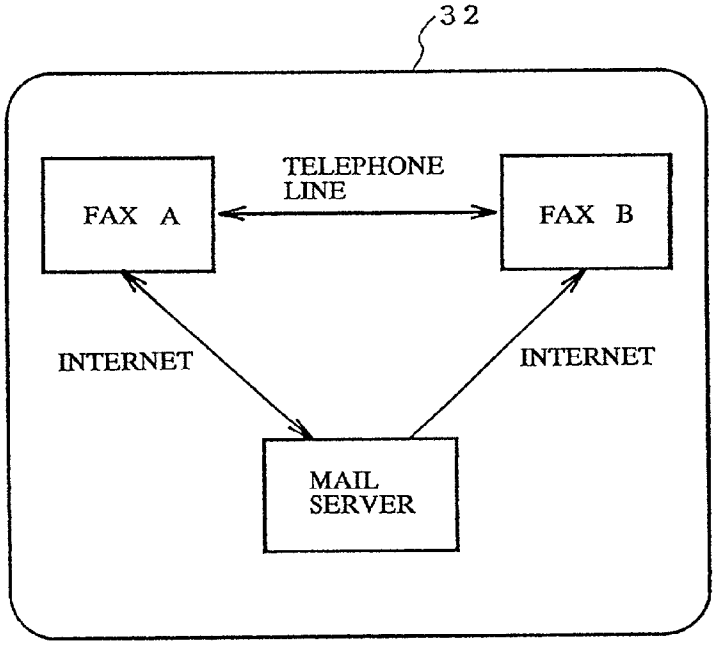

32
FAX A
TELEPHONE LINE
FAX B
INTERNET
INTERNET
MAIL SERVER

Fig. 5

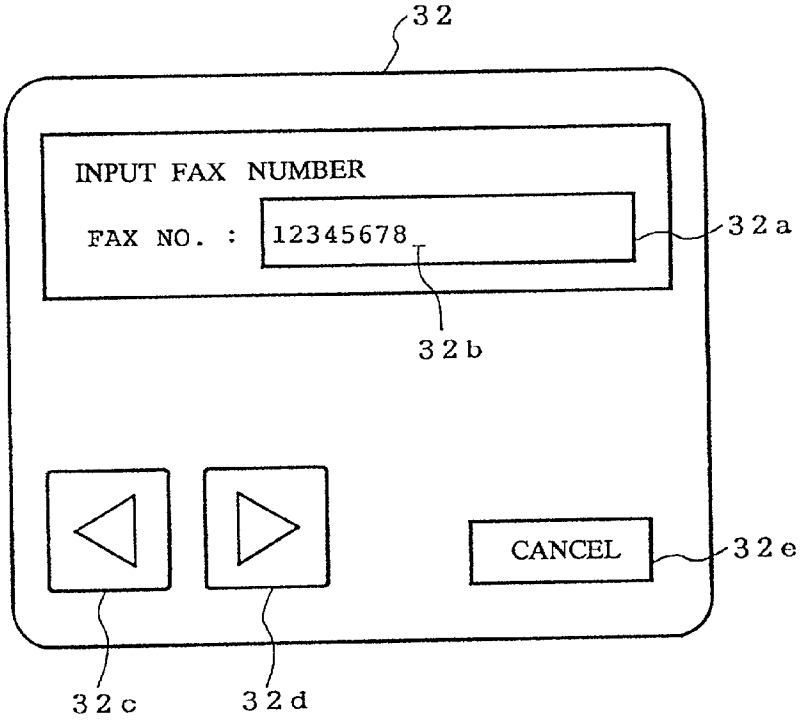

32
INPUT FAX NUMBER
FAX NO. : 12345678
32a
32b
CANCEL
32e
32c
32d

Fig. 6

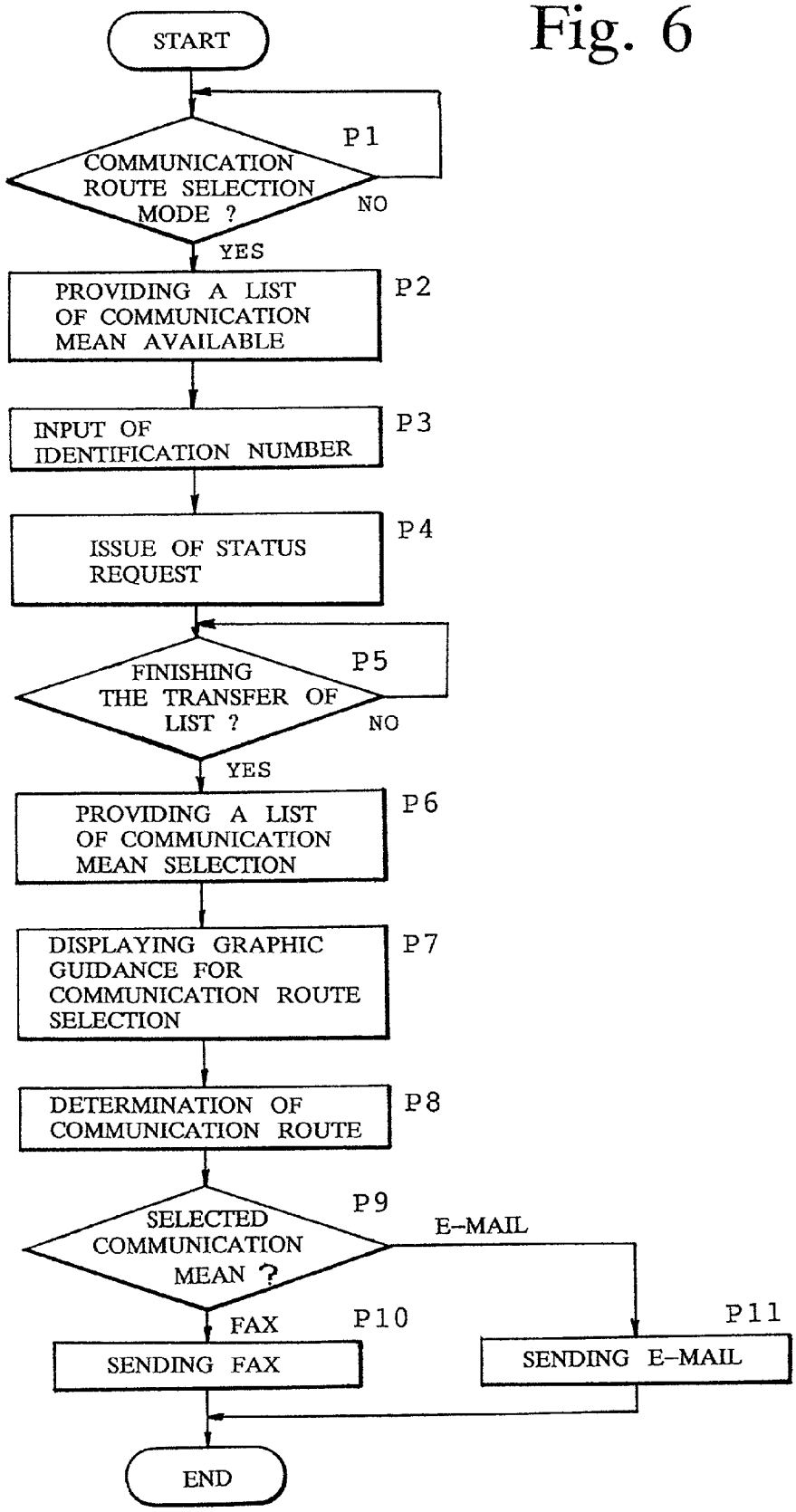

START
P1
COMMUNICATION ROUTE SELECTION MODE ?
NO
YES
PROVIDING A LIST OF COMMUNICATION MEAN AVAILABLE
P2
INPUT OF IDENTIFICATION NUMBER
P3
ISSUE OF STATUS REQUEST
P4
P5
FINISHING THE TRANSFER OF LIST ?
NO
YES
PROVIDING A LIST OF COMMUNICATION MEAN SELECTION
P6
DISPLAYING GRAPHIC GUIDANCE FOR COMMUNICATION ROUTE SELECTION
P7
DETERMINATION OF COMMUNICATION ROUTE
P8
P9
SELECTED COMMUNICATION MEAN ?
E-MAIL
FAX
P10
P11
SENDING FAX
SENDING E-MAIL
END

Fig. 7

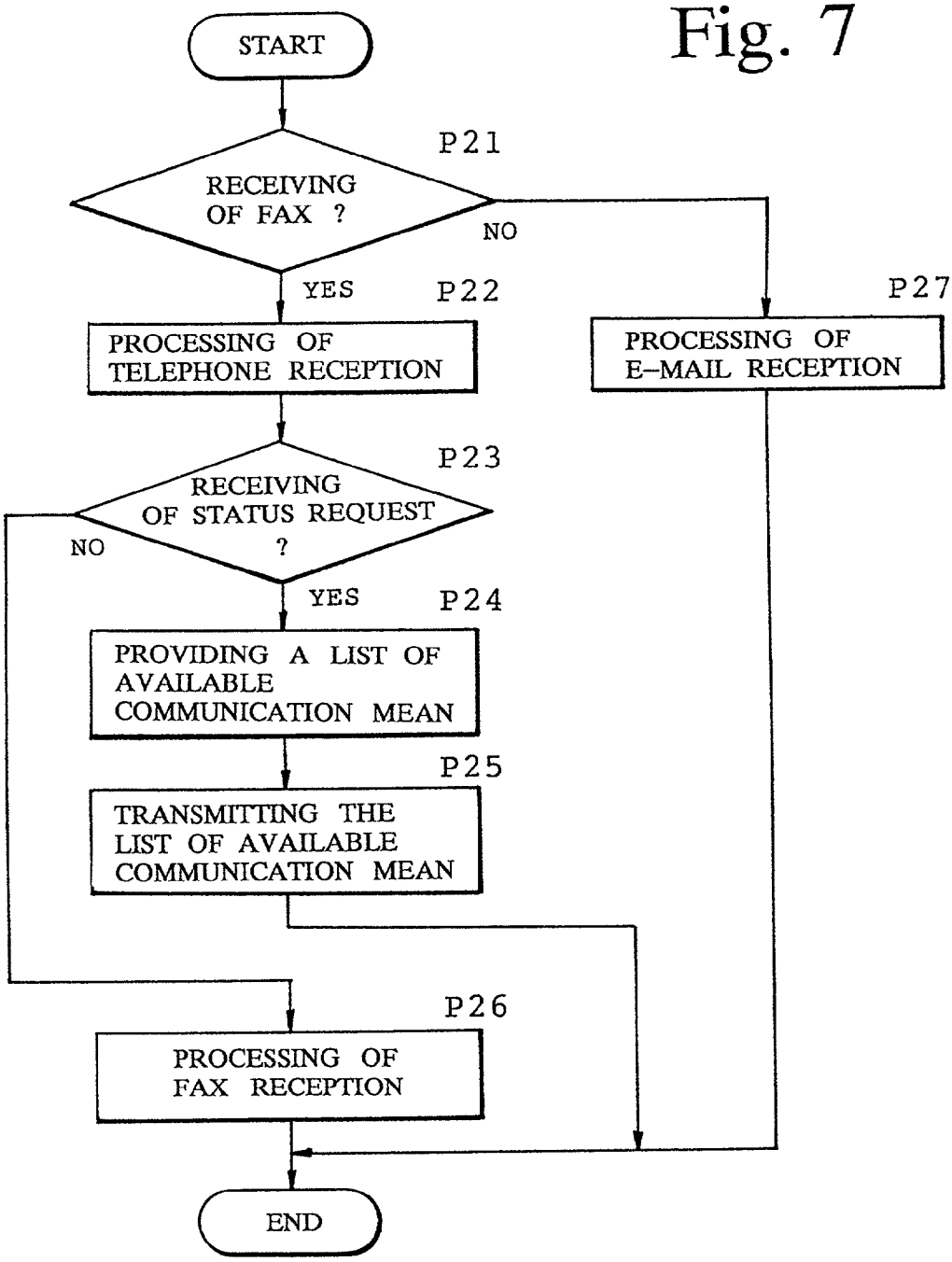

START
P21
RECEIVING OF FAX ?
NO
YES
P22
PROCESSING OF TELEPHONE RECEPTION
P27
PROCESSING OF E-MAIL RECEPTION
P23
RECEIVING OF STATUS REQUEST ?
NO
YES
P24
PROVIDING A LIST OF AVAILABLE COMMUNICATION MEAN
P25
TRANSMITTING THE LIST OF AVAILABLE COMMUNICATION MEAN
P26
PROCESSING OF FAX RECEPTION
END

Fig. 8

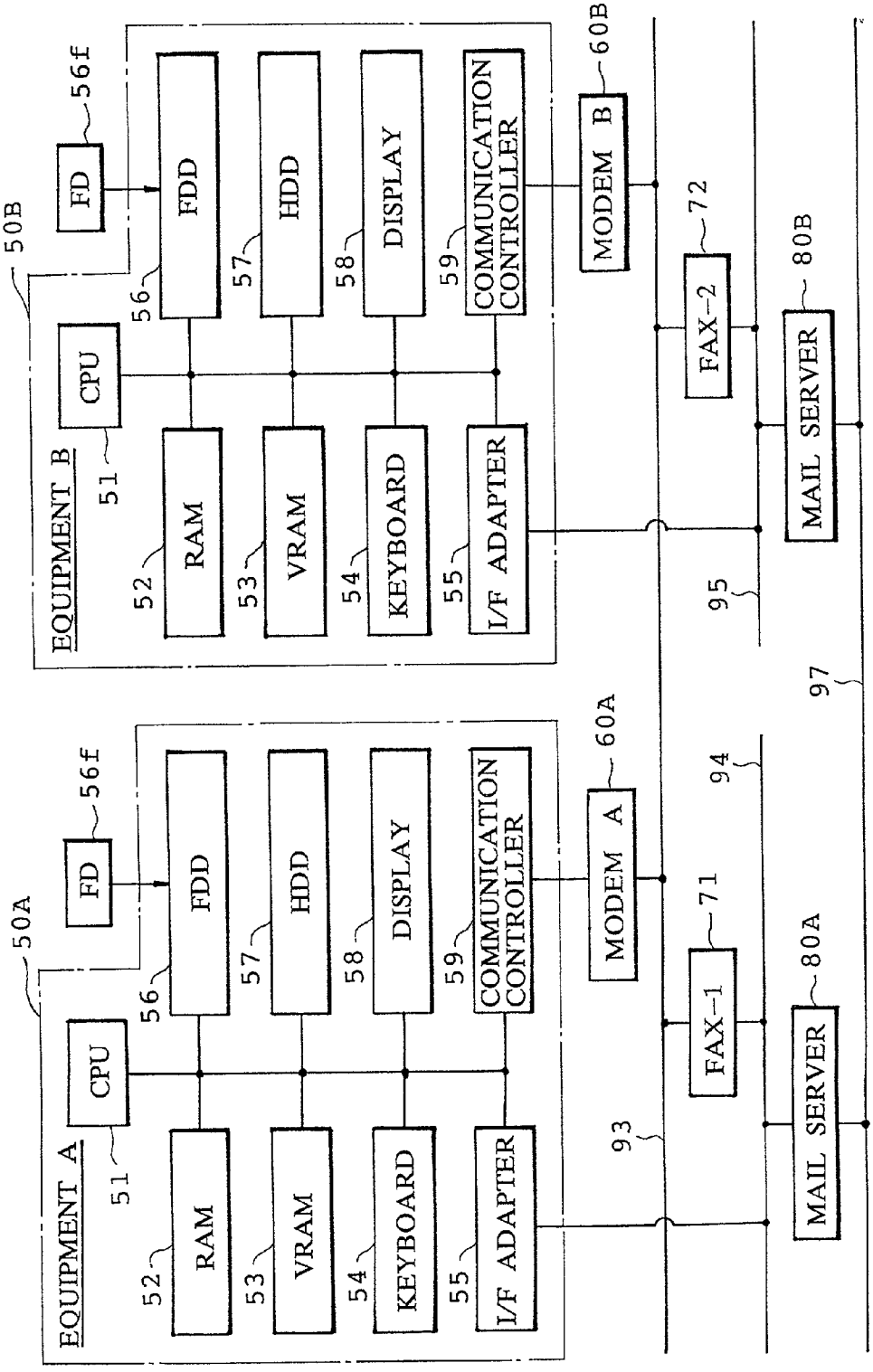

EQUIPMENT A
50A
CPU
51
RAM
52
VRAM
53
KEYBOARD
54
I/F ADAPTER
55
FD
56f
FDD
56
HDD
57
DISPLAY
58
COMMUNICATION CONTROLLER
59
MODEM A
60A
EQUIPMENT B
50B
CPU
51
RAM
52
VRAM
53
KEYBOARD
54
I/F ADAPTER
55
FD
56f
FDD
56
HDD
57
DISPLAY
58
COMMUNICATION CONTROLLER
59
MODEM B
60B
93
94
95
97
FAX-1
71
FAX-2
72
MAIL SERVER
80A
MAIL SERVER
80B

Fig. 9

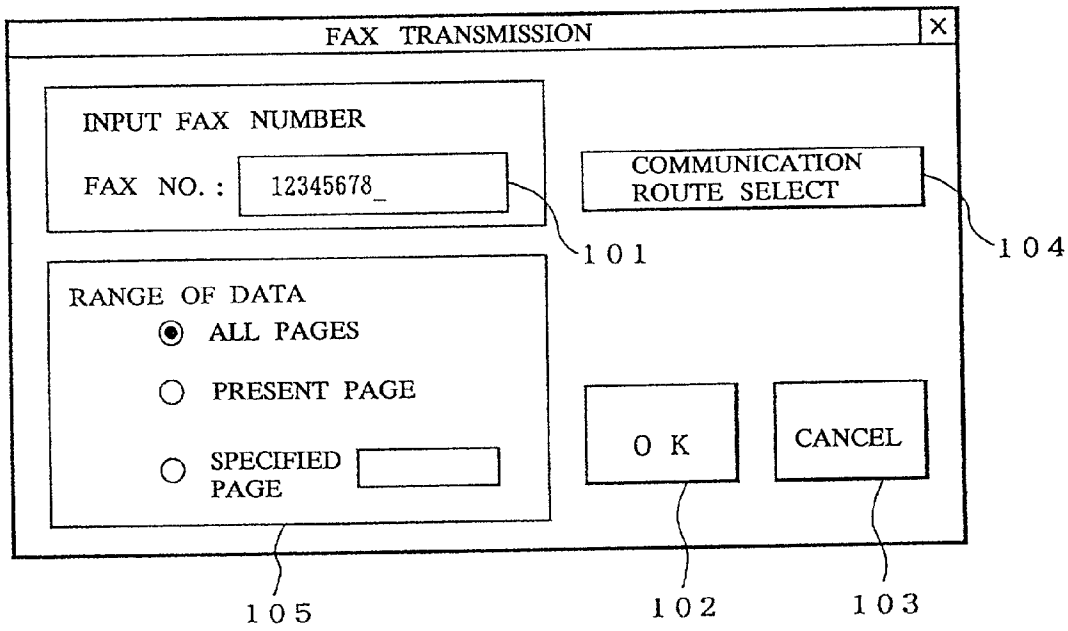

FAX TRANSMISSION
INPUT FAX NUMBER
FAX NO. : 12345678_
COMMUNICATION ROUTE SELECT
RANGE OF DATA
ALL PAGES
PRESENT PAGE
SPECIFIED PAGE
O K
CANCEL
101
104
105
102
103

Fig. 10(a)

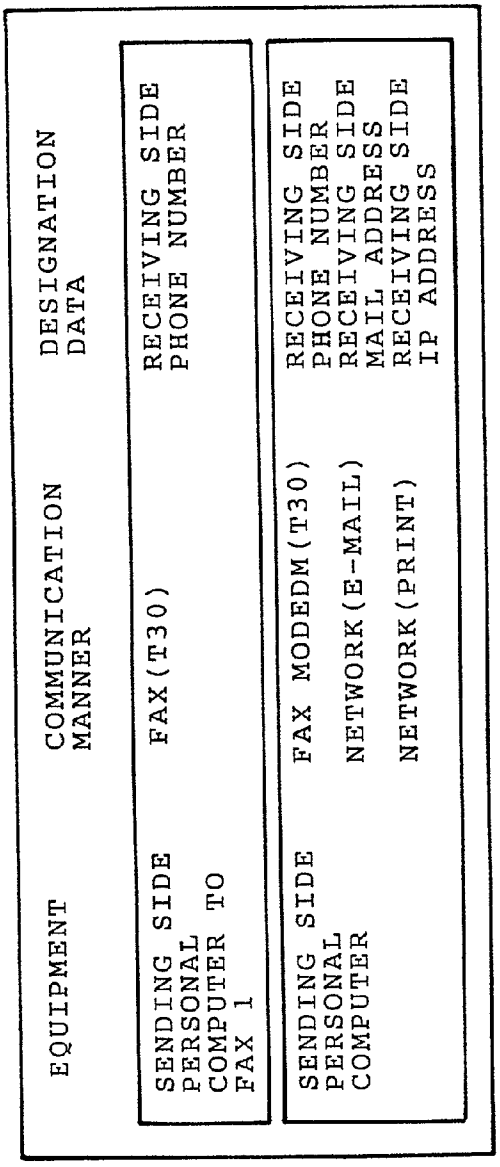


Fig. 10(b)

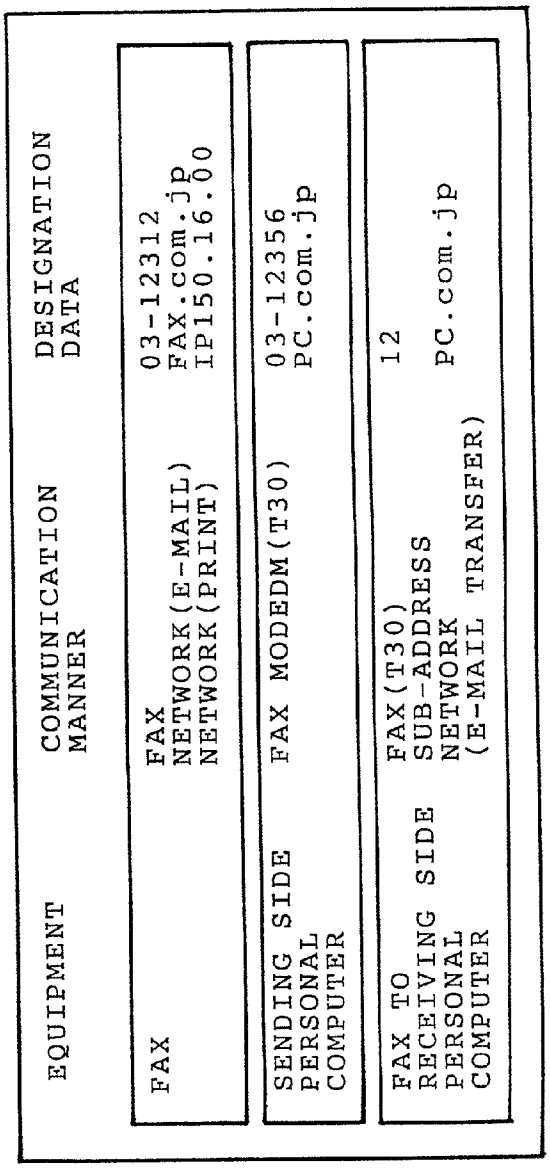


Fig. 11

COMMUNICATION ROUTE	ADDRESS-1	ADDRESS-2
SENDING EQUIPMENT A → MODEM A → → MODEM B → RECEIVING EQUIPMENT B	FAX NUMBER OF MODEM B	
SENDING EQUIPMENT A → MODEM A → FAX 2 → → RECEIVING EQUIPMENT B	FAX NUMBER OF FAX 2	IP ADDRESS OF SENDING EQUIPMENT
SENDING EQUIPMENT A → MODEM A → FAX 2 → → E-MAIL → RECEIVING EQUIPMENT B	FAX NUMBER OF FAX 2	E-MAIL ADDRESS
SENDING EQUIPMENT A → FAX 1 → MODEM B → → RECEIVING EQUIPMENT B	FAX NUMBER OF MODEM B	
SENDING EQUIPMENT A → FAX 1 → FAX 2 → → RECEIVING EQUIPMENT B	FAX NUMBER OF FAX 2	IP ADDRESS OF SENDING EQUIPMENT
SENDING EQUIPMENT A → FAX 1 → FAX 2 → → E-MAIL → RECEIVING EQUIPMENT B	FAX NUMBER OF FAX 2	E-MAIL ADDRESS
SENDING EQUIPMENT A → E-MAIL → → RECEIVING EQUIPMENT B	E-MAIL ADDRESS	

Fig. 12

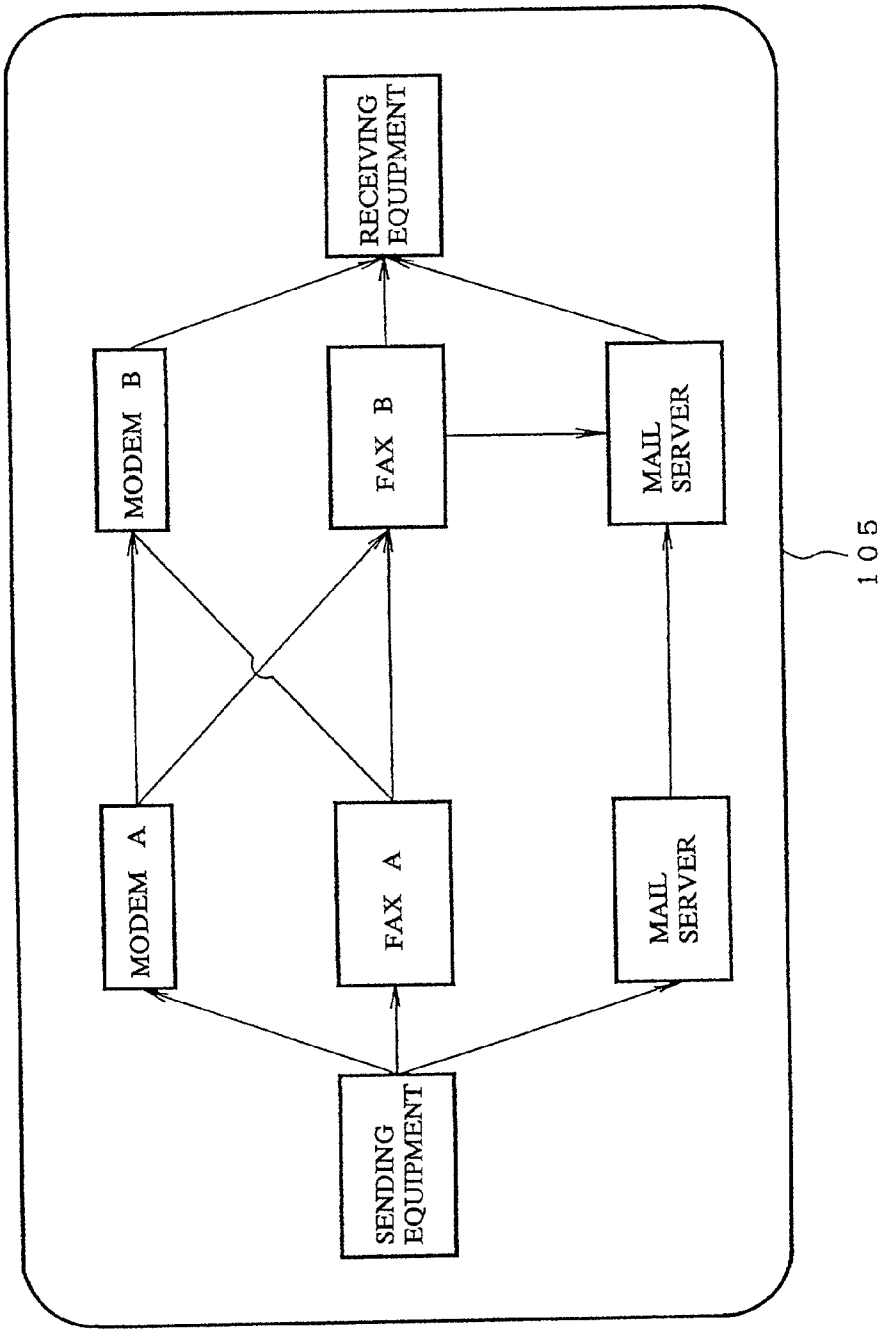

RECEIVING EQUIPMENT
MODEM B
FAX B
MAIL SERVER
MODEM A
FAX A
MAIL SERVER
SENDING EQUIPMENT
105

Fig. 13

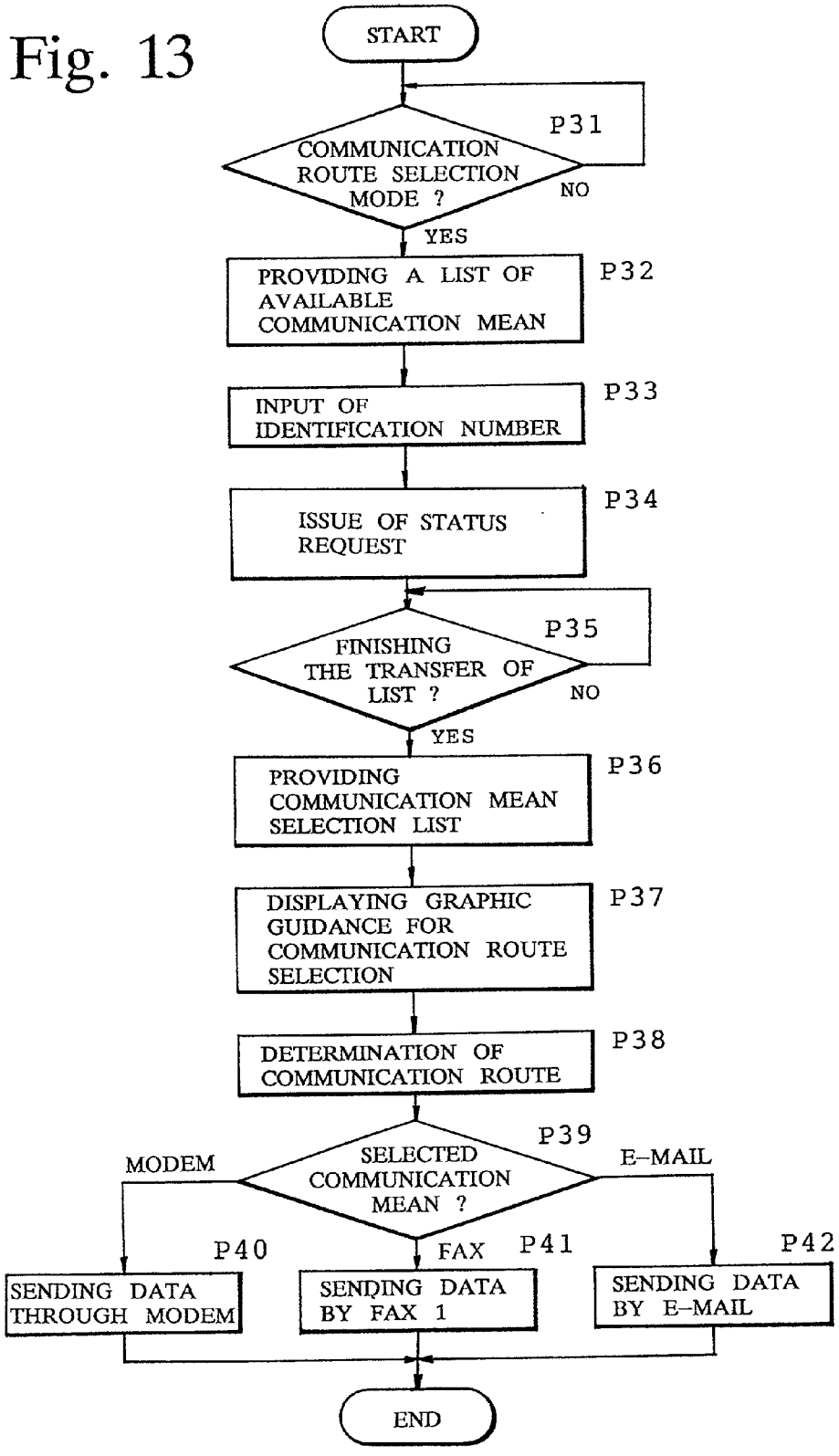

START
P31
COMMUNICATION ROUTE SELECTION MODE ?
NO
YES
PROVIDING A LIST OF AVAILABLE COMMUNICATION MEAN
P32
INPUT OF IDENTIFICATION NUMBER
P33
ISSUE OF STATUS REQUEST
P34
P35
FINISHING THE TRANSFER OF LIST ?
NO
YES
PROVIDING COMMUNICATION MEAN SELECTION LIST
P36
DISPLAYING GRAPHIC GUIDANCE FOR COMMUNICATION ROUTE SELECTION
P37
DETERMINATION OF COMMUNICATION ROUTE
P38
P39
SELECTED COMMUNICATION MEAN ?
MODEM
FAX
E-MAIL
P40
P41
P42
SENDING DATA THROUGH MODEM
SENDING DATA BY FAX 1
SENDING DATA BY E-MAIL
END

Fig. 14

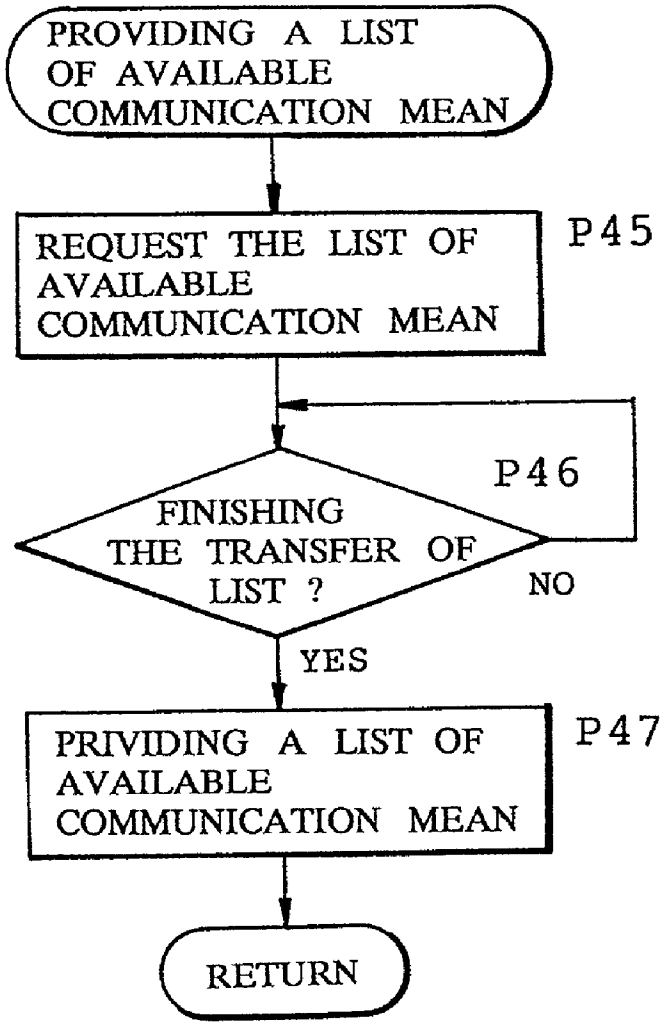

PROVIDING A LIST OF AVAILABLE COMMUNICATION MEAN
REQUEST THE LIST OF AVAILABLE COMMUNICATION MEAN
P45
P46
FINISHING THE TRANSFER OF LIST ?
NO
YES
PRIVIDING A LIST OF AVAILABLE COMMUNICATION MEAN
P47
RETURN

Fig. 15

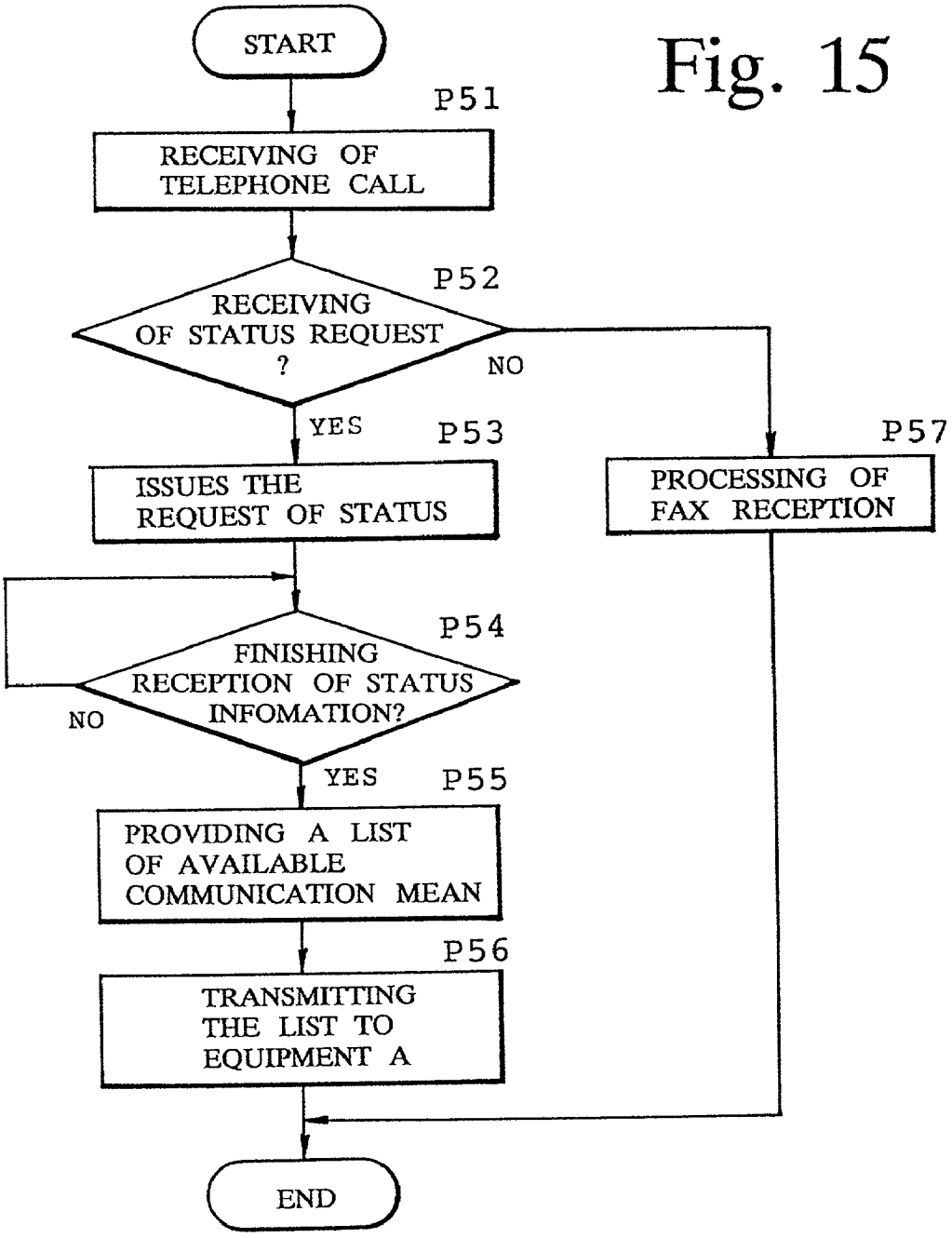
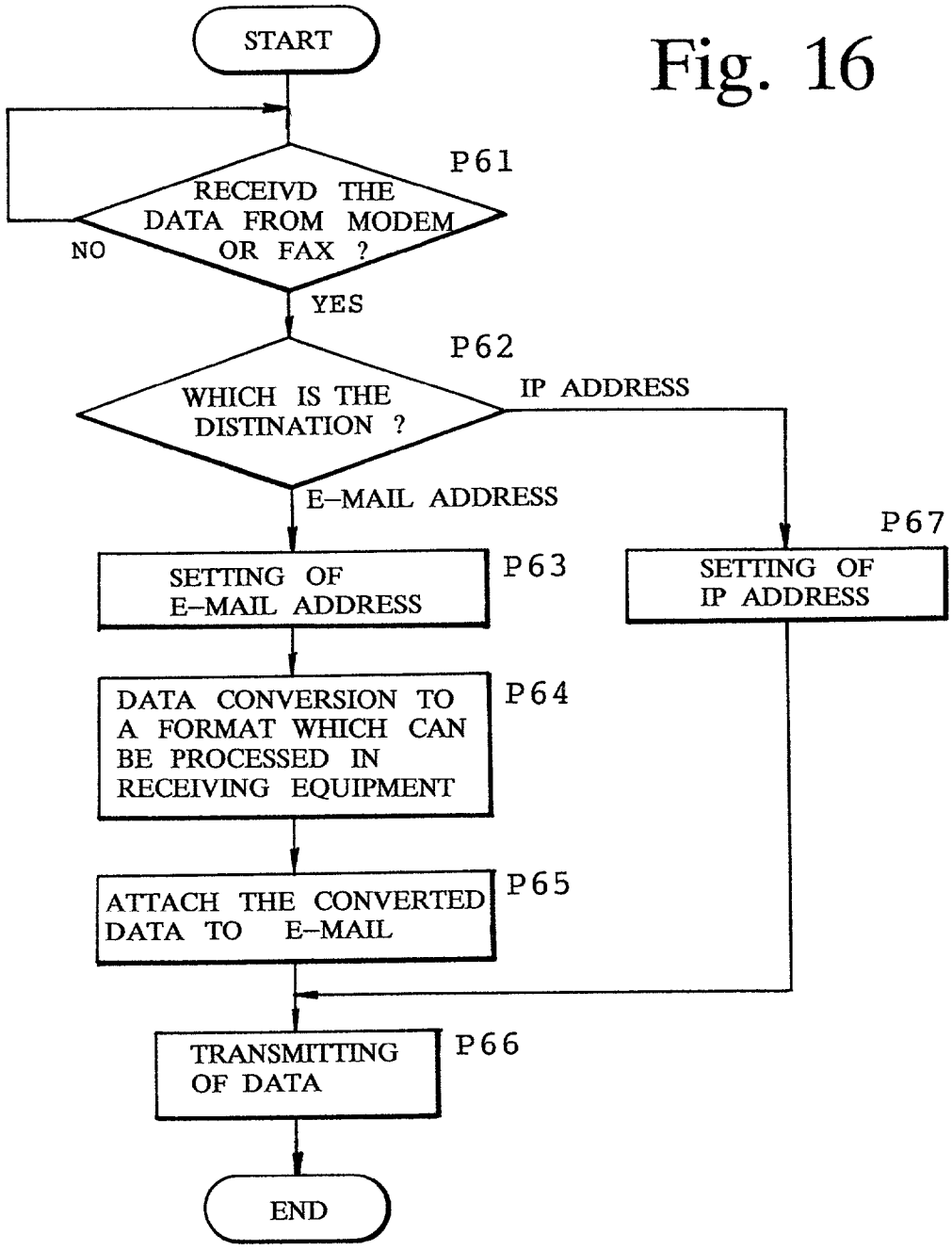

START
P51
RECEIVING OF TELEPHONE CALL
P52
RECEIVING OF STATUS REQUEST ?
NO
YES
P53
ISSUES THE REQUEST OF STATUS
P57
PROCESSING OF FAX RECEPTION
P54
FINISHING RECEPTION OF STATUS INFOMATION?
NO
YES
P55
PROVIDING A LIST OF AVAILABLE COMMUNICATION MEAN
P56
TRANSMITTING THE LIST TO EQUIPMENT A
END

Fig. 16


START
P61
RECEIVD THE DATA FROM MODEM OR FAX ?
NO
YES
P62
WHICH IS THE DISTINATION ?
IP ADDRESS
E-MAIL ADDRESS
P67
SETTING OF E-MAIL ADDRESS
P63
SETTING OF IP ADDRESS
DATA CONVERSION TO A FORMAT WHICH CAN BE PROCESSED IN RECEIVING EQUIPMENT
P64
ATTACH THE CONVERTED DATA TO E-MAIL
P65
TRANSMITTING OF DATA
P66
END

COMMUNICATION EQUIPMENT COMMUNICATION ROUTE SELECTION METHOD AND COMPUTER PROGRAM PRODUCT IN MEMORY FOR SELECTING A COMMUNICATION ROUTE

[0001] This application is based on patent application No. 9-330832 filed in Japan, the contents of which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a communication equipment having multiple communication functions, a communication route selection method, and a computer program product in memory for selecting a communication route.

[0004] 2. Description of the Prior Art

[0005] When information is sent to the receiving party, it is generally sent depending on the communication function equipped on the communication equipment of the receiving party. For example, in case the receiving equipment has the facsimile function (will be termed "FAX function" hereinafter), information is sent by use of its FAX function. In case the receiving equipment has the electronic mail function (will be termed "E-mail function" hereinafter), information is sent by use of its E-mail function. In case the receiving equipment has the Internet FAX function, information is sent by use of its Internet FAX function. In case the sending equipment and receiving equipment are connected through a LAN (local area network), information can be sent by use of the LAN.

[0006] Some communication equipments developed recently have multiple communication functions among the above-mentioned FAX function, E-mail function, Internet FAX function, and LAN connecting function. In the case of communication between these multi-functional communication equipment, the sending party is allowed to send information by choosing a proper communication function of the receiving equipment, instead of installing plural communication equipments having different functions.

[0007] These multi-functional communication equipment allow the sending party to choose a communication function depending on individual communication purposes. For example, for low-cost communication, the expensive FAX communication can be avoided. For retaining the high-quality image transfer, the LAN connecting function or E-mail function can be used. In the latter case, however, communication based on E-mail cannot be achieved unless the receiving person operates the computer to open the mail box. In contrast, the FAX communication produces a print of information on the receiving equipment, and it can be handed to the receiving person. Accordingly, the FAX communication can possibly be faster practically than the E-mail communication, and the former may be chosen occasionally.

[0008] The Internet FAX function will be explained. In sending information by using FAX, the telephone line fee is charged, and therefore the communication fee depends on the distance between a sending party and a receiving party. A conceivable manner of low-cost communication to a distant receiving party is the use of the Internet, and it is called "Internet FAX function".

[0009] It is assumed that the sending party has FAX unit F1, intermediate FAX units F2 and F3 are connected through the Internet, and the receiving party has FAX unit F4, of which F1 and F2 are located in town A, and F3 and F4 are located in remote town B. In this situation, information is sent from F1 to F2 in the same town over the telephone line, it is sent from F2 to F3 through the Internet, and it is sent from F3 to F4 in the same town over the telephone line. This information sending manner enables a low communication fee based on the use of the Internet for long-distance communication between town A and town B.

[0010] Among other information sending manners, the sending party can connect its FAX F1 directly to the Internet, or the sending party can connect its FAX F1 to the LAN which has the connection with the Internet.

[0011] Although multi-functional communication units allow the sending party to choose the best communication function based on the judgement of situation as explained above, the conventionally available multi-functional communication equipment do not inform the sending party of what communication function has the receiving equipment, or as to whether the receiving equipment has a communication function that matches with the function of the self equipment, causing the sending party to be troubled in choosing a communication function or to send information by using a function that is not the best.

SUMMARY OF THE INVENTION

[0012] A prime object of the present invention is to provide an innovative communication equipment capable of sending information from the sending equipment to the receiving equipment based on the selection of a proper communication route from among multiple available communication routes.

[0013] Another object of the present invention is to provide an innovative communication equipment capable of sending information from the sending equipment to the receiving equipment based on the finding of multiple communication routes that are available between these equipments and the selection of a communication route among the found communication routes.

[0014] Still another object of the present invention is to provide a method of selecting a communication route among multiple communication routes that are available between the sending equipment and receiving equipment.

[0015] Still another object of the present invention is to provide a computer program product in memory for implementing the process of selecting a communication route among multiple communication routes that are available between the sending equipment and receiving equipment.

[0016] Other objects of the present invention will become apparent from the following detailed description of embodiments taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] **FIG. 1** is a block diagram showing a first example of the communication network;

[0018] **FIG. 2** is a front view of the operation panel of the facsimile unit as a communication equipment;

[0019] FIGS. **3**(*a*), **3**(*b*) and **3**(*c*) are diagrams showing examples of display on the LCD display screen, listing available communication means;

[0020] **FIG. 4** is a diagram showing an example of display on the LCD display screen at the selection of a communication route;

[0021] **FIG. 5** is a diagram showing an example of display on the LCD display screen at the entry of the receiving equipment identification number;

[0022] **FIG. 6** is a flowchart showing the processing carried out by the CPU of the sending equipment for selecting a communication route;

[0023] **FIG. 7** is a flowchart showing the processing carried out by the CPU of the receiving equipment for sending a list of available communication means;

[0024] **FIG. 8** is a block diagram showing a second example of the communication network;

[0025] **FIG. 9** is a diagram showing an example of the FAX sending dialog box which is displayed on the display screen of the sending at the call of the FAX sending menu;

[0026] **FIG. 10**(*a*) and **FIG. 10**(*b*) are diagrams showing an example of display on the LCD display screen, listing available communication means;

[0027] **FIG. 11** is a table showing examples of communication means that are available between the sending equipment and receiving equipment;

[0028] **FIG. 12** is a diagram showing an example of display on the LCD display screen at the selection of a communication route;

[0029] **FIG. 13** is a flowchart showing the processing carried out by the CPU of the sending equipment for selecting a communication route;

[0030] **FIG. 14** is a flowchart showing the details of the processing of making a list of available communication means;

[0031] **FIG. 15** is a flowchart showing the processing carried out by the CPU of the receiving equipment for sending a list of available communication means; and

[0032] **FIG. 16** is a flowchart showing the processing of transferring document data.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0033] Embodiments of the present invention will be explained.

First Embodiment

[0034] **FIG. 1** shows a communication network pertinent to the first embodiment of this invention. The network includes equipment A which is a facsimile (FAX) equipment **10**A and unit B which is a FAX unit **10**B. These FAX units **10**A and **10**B are connected to the telephone line **23** through communication controller **18**, and also connected through their interface adapters **15** to Ethernets, e.g., LANs, **24** and **25**, respectively, with these Ethernets **24** and **25** being connected through mail servers **20**A and **20**B, respectively, to the Internet **27**.

[0035] The following explains the sending of document data from the FAX unit **10**A to the FAX unit **10**B.

[0036] Each of the FAX units **10**A and **10**B, which is controlled by a CPU **11**, has a RAM **12** for temporarily storing document data of a source document which has been read and document data which has been received, a ROM **13** for storing control programs, an image reader **14** which reads the text in an optical manner, an interface adapter **15** which connects the FAX unit to the Ethernet, an operation panel **16**, a printer **17**, and a communication controller **18** which connects the FAX unit to the telephone line.

[0037] Among these functional devices, the image reader **14**, printer **17**, interface adapter **15**, communication controller **18**, and mail servers **20**A and **20**B are known of their structures and functions, and detailed explanation thereof will be omitted.

[0038] **FIG. 2** shows the operation panel **30** of the sending FAX unit **10**A. The operation panel **30** has a FAX mode select key **31***a*, a copy mode select key **31***b*, a print mode select key **31***c*, a scan mode select key **31***d*, an E-mail select key **31***e*, and an LCD display screen **23** which displays the selected mode and the state of the unit and allows data input based on the laminated touch-panel.

[0039] Among the operational modes selected by the mode selection keys of the FAX unit **10**A, the copy mode is to read the source text and make a copy of it, the print mode is to print data received by facsimile and stored in the memory, and the scan mode is to send document data which has been read on the sending FAX unit **10**A to the personal computer and the scan mode is operable when reception program initiated in response to the detection of document data from the FAX is stored in the personal computer. These operational modes selected with the mode selection keys, however, do not relate directly to the communication route selection which will be explained later.

[0040] The operation panel **30** further includes a ten-key set **33** which is used to enter numerals and also enter alphabetic characters in the E-mail mode. The ten-key set **33** is designed to allow the entry of a comma, space and symbols, in addition to the alpha-numeric characters and symbols * and # that are labeled on the key tops. For example, when the key "1" is hit once, numeral "1" is entered; when it is hit twice, character "A" is entered; when it is hit three times, "B" is entered; when it is hit four times, "C" is entered; and when it is hit gain, the initial condition is restored to enter "1". The entered character is displayed on the LCD display screen **32**. When the key "*" is hit once, symbol, "*" is entered; when it is hit twice, symbol "@" is entered; when it is hit three times, symbol "&" is entered; and when it is hit four times, symbol "¥" is entered. When the key "#" is hit once, symbol "#" is entered; and when it is hit twice, a space is entered. The entered symbol is displayed on the LCD display screen **32**.

[0041] The operation panel **30** further includes a start key **34** which is used to start the operation of the FAX unit **10**A, a stop key **35** which is used to terminate the operation, and a communication route selection mode key **36** which is used to bring the unit into the mode of selecting a image data transfer route.

[0042] The receiving FAX unit **10**B may have the same operation panel, or may include mode selection keys for other operational modes.

[0043] FIGS. **3**(*a*), **3**(*b*) and **3**(*c*) show displays on the LCD display screen **32** when the communication route has been selected by the operation of the communication route selection mode key **36** on the operation panel **30**.

[0044] **FIG. 3**(*a*) shows the display of communication means that are available for the receiving equipment B, **FIG. 3**(*b*) shows the display of communication means that are available for the sending equipment A, and **FIG. 3**(*c*) shows the display of the result of arrangement, indicating that FAX and E-mail are available as common means of communication from the sending equipment A to the receiving equipment B.

[0045] **FIG. 4** shows the display on the LCD display screen **32** at the selection of a communication route, prompting the selection of a communication route for the case of the available communication means shown in **FIG. 3**(*c*). When the user touches a screen position on the line, i.e., telephone line **23** in this example, connecting between FAX-A **10**A and FAX-B **10**B, or a screen position in a block of facility, i.e., mail server **20**B in this example, the touched position is detected by the touch-panel on the LCD display screen **32**, and the corresponding communication route is selected.

[0046] **FIG. 5** shows the display on the LCD display screen **32** when the unit is in the initial state or after the FAX mode key **31***a* has been depressed. The display includes a FAX number field **32***a*, a cursor **32***b* in the field **32***a*, cursor moving keys **32***c* and **32***d*, and a cancel key **32***e* which is used to delete the numeral at the cursor position. When a FAX number is entered with the ten-key set **33**, each digit is entered and displayed at the position of the cursor **32***b*.

[0047] Next, the processes implemented by the CPU **11** of **FIG. 1** for the selection of a communication route and the sending and reception of document data will be explained on the flowcharts of **FIG. 6** and **FIG. 7**.

[0048] **FIG. 6** is a flowchart showing the processing of communication route selection and document data transfer implemented by the CPU **11** of the sending equipment A. It is detected whether the communication route selection mode which is invoked with the communication route selection mode key **36** is selected or not (step **P1**). When the communication route selection mode is selected, there is provided a list of communication means available for the sending equipment A as shown in **FIG. 3**(*b*) (step **P2**).

[0049] Next, the user is prompted to enter the receiving equipment identification number. On the LCD display screen **32** of the operation panel **30**, with the display of **FIG. 5** appearing in response to the setting of the communication route selection mode, the user enters the FAX number of the receiving party with the ten-key set **33** (step **P3**). The entered FAX number is dialed automatically, and the sending equipment (FAX-A) and receiving equipment (FAX-B) are linked through the telephone line.

[0050] The CPU **11** issues a status request to the receiving equipment B in order to examine the state of the receiving equipment B, i.e., it requests the transfer of a list of communication means that are available for the receiving equipment B as shown in **FIG. 3**(*a*) (step **P4**). The CPU **11** waits for the transfer of the list of available communication means from the receiving equipment B (step **P5**).

[0051] On receiving the list of available communication means from the receiving equipment B, a communication means selection list (refer to **FIG. 3**(*c*)) is produced from the list of communication means available at the sending equipment A (refer to **FIG. 3**(*b*)) and the list of communication means available for the receiving equipment B (refer to **FIG. 3**(*a*)) (step **P6**), and displays a graphic guidance for communication route selection (refer to **FIG. 4**) on the LCD display screen **32** (step **P7**). In response to the user's operation on the LCD display screen **32**, the communication route and communication means are determined (step **P8**).

[0052] The sending equipment A reads the source document and sends document data to the receiving equipment B by using the selected communication means over the selected communication route, i.e., by using FAX or E-mail based on the selection and determination of communication route and means (steps **P9**, **P10** and **P11**), and terminates the operation.

[0053] **FIG. 7** is a flowchart showing the transmitting of available communication means list and reception of document data implemented by the receiving equipment B. It is judged whether document data is received by FAX or E-mail or not (step **P21**). In case of E-mail reception, the processing of E-mail reception is implemented (step **P27**), and the operation is terminated.

[0054] In case of FAX reception in step **P21**, the processing of telephone reception is implemented (step **P22**), and subsequently it is judged whether a status request from the sending equipment A is received or not (step **P23**). On receiving the status request, a list of available communication means is produced and the list is transmitted to the sending equipment A (steps **P24** and **P25**), and the operation is terminated.

[0055] Otherwise, in response to the negation of the status request judgement in step **P23**, the processing of FAX reception is implemented (step **P26**), and the operation is terminated.

Second Embodiment

[0056] Next, the second embodiment of this invention will be explained.

[0057] **FIG. 8** shows a communication network including equipment A which is a personal computer **50**A and equipment B which is a personal computer **50**B. These computers **50**A and **50**B are connected to the telephone line **93** through their modems **60**A and **60**B, and also connected through their interface adapters **55** to Ethernets, e.g., LANS,**94** and **95**, respectively, with these Ethernets **94** and **95** being connected through mail servers **80**A and **80**B, respectively, to the Internet **97**. The network further includes a facsimile unit (FAX-**1**) **71** and another facsimile unit (FAX-**2**) **72** both connected to the telephone line **93** and also connected to Ethernets **94** and **95**, respectively.

[0058] The following explains the transfer of data from the equipment A, i.e., personal computer **50**A, to the equipment B, i.e., personal computer **50**B.

[0059] Each of the personal computers **50**A and **50**B, which is controlled by a CPU **51**, has a RAM **52** for

temporarily storing document data of a source document which has been read and document data which has been received, a VRAM **53** for storing control programs, a keyboard **54**, an interface adapter **55**, a floppy disk drive (FDD) **56**, a hard disk drive (HDD) **57**, a display **58**, and a communication controller **59** which connects the personal computer to the telephone line.

[**0060**] Among these functional devices, the personal computers **50**A and **50**B, FAX units **71** and **72**, and mail servers **80**A and **80**B are known of their structures and functions, and detailed explanation thereof will be omitted.

[**0061**] **FIG. 9** shows the FAX sending dialog box which is displayed on the display screen **58** of the personal computer **50**A in response to the call of the FAX sending menu from an application program running currently on the equipment A. The user enters the FAX number of the receiving equipment B in the field **101**. By clicking the OK key **102** with the mouse device, the data specified in the range field **105** is sent to the equipment B. The user can point the cancel key **103** and click the mouse device to turn off the FAX sending dialog box and return to the application program.

[**0062**] The dialog box further includes a communication route selection mode key **104**. By clicking the key **104** with the mouse device, the unit enters the mode for selecting a communication route between the sending equipment A, i.e., personal computer **50**A, and the receiving equipment B, i.e., personal computer **50**B, with lists of available communication routes being displayed.

[**0063**] **FIG. 10**(*a*) shows a display of communication routes available for the sending equipment A, and **FIG. 10**(*b*) shows a display of communication routes available for the receiving equipment B.

[**0064**] **FIG. 11** is a list of communication means available as common for communication between the sending equipment A and the receiving equipment B resulting from the tables of FIGS. **10**(*a*) and **10**(*b*). On the table of **FIG. 11**, column "address-**1**" indicates the address of the first destination of document data from the sending equipment A, and column "address-**2**" indicates the address of the final destination of document data. An IP address means an Internet Protocol address.

[**0065**] **FIG. 12** shows a display on the LCD display screen **105** when communication route selection mode key **104** is depressed, and this example is for the case where the communication means listed in **FIG. 11** are available. The user selects a communication route by sequentially clicking the mouse device while pointing a line or a facility (FAX **1**, FAX **2**, modem A, modem B, or mail server in this example) located between the sending equipment A and the receiving equipment B.

[**0066**] Next, the processes implemented by the CPU **51** of **FIG. 8** for the selection of a communication route and the transfer of image data will be explained on the flowcharts of **FIG. 13** through **FIG. 16**.

[**0067**] **FIG. 13** is a flowchart showing the processing of communication route selection and document data transferring implemented by the CPU **51** of the sending equipment A.

[**0068**] It is detected whether the communication route selection mode key is pointed and clicked in the dialog box in the display or not (step P**31**). When the route selection mode is selected, there is provided a list of communication means available for the sending equipment A as shown in **FIG. 10**(*a*) (step P**32**). This listing process will be explained in detail later on the flowchart of **FIG. 14**.

[**0069**] Subsequently, the communication route selection dialog box is displayed to prompt the user to enter the FAX number of the receiving equipment B in the FAX number field. The user operates the ten-key set to enter the destination FAX number (step P**33**). The entered FAX number is dialed automatically, and the sending equipment and receiving equipment are linked through the telephone line.

[**0070**] The CPU **51** issues a status request to the receiving equipment B in order to examine the state of the receiving equipment B, i.e., it requests the transfer of a list of communication means that are available for the receiving equipment (step P**34**). The CPU **51** waits for the transfer of the list of available communication means from the receiving equipment B (step P**35**).

[**0071**] On receiving the list of available communication means from the receiving equipment B, a communication means selection list (refer to **FIG. 11**) is produced from the list of communication means available for the sending equipment A (refer to **FIG. 10**(*a*)) and the list of communication means available for the receiving equipment B (refer to **FIG. 10**(*b*)) (step P**36**), and a graphic guidance for the communication route selection (refer to **FIG. 12**) is displayed on the display screen **105** (step P**37**).

[**0072**] In response to the user's operation on the display, the communication route and communication means are determined (step P**38**).

[**0073**] The sending equipment A reads the source document, and sends document data to the receiving equipment B by using the selected communication means over the selected communication route, i.e., by using the modem A, FAX-**1** or mail server based on the selection and determination of communication route and means (steps P**39**, P**40**, P**41** and P**42**), and terminates the operation.

[**0074**] Next, the process of step P**40** on the flowchart of **FIG. 13** for sending document data to the receiving equipment B via the determined communication route and modem A will be explained. The process is carried out based on the modem communication program stored on the hard disk of the sending equipment A, with the destination FAX number being set to the program.

[**0075**] In case the communication route is from equipment A→modem A→modem B and to equipment B, the FAX number of modem B is used on the first row of the address-**1** column in the table of **FIG. 11** to carry out the FAX communication.

[**0076**] In case the communication route is from equipment A→modem A→FAX **2** and to equipment B, the FAX number of FAX **2** is used on the second row of the address-**1** column and the sub-address (address-**2**) for the transfer of document data from the FAX **2** to the equipment B in the table of **FIG. 11** to carry out the FAX communication. Document data is transferred from the FAX **2** to the equipment B over the network, and therefore the sub-address (address-**2**) is the IP address (Internet Protocol address) of the equipment B.

[0077] In case the communication route is from equipment A→modem A→FAX **2** and to equipment B via E-mail, the FAX number of FAX **2** is used on the third row of the address-**1** column and the sub-address (address-**2**) for the transfer of document data from the FAX **2** to the equipment B in the table of **FIG. 11** to carry out the FAX communication. Document data is transferred from the FAX **2** to the equipment B via E-mail, and therefore the sub-address (address-**2**) is the E-mail address of the equipment B.

[0078] Next, the process of step P**41** on the flowchart of **FIG. 13** for sending document data to the receiving equipment B via the determined communication route and FAX **1** will be explained. The process is carried out based on the program for the FAX **1** stored on the hard disk of the sending equipment A.

[0079] In case the communication route is from equipment A→FAX **1**→modem B and to equipment B, the FAX number of modem B is used on the fourth row of the address-**1** column in the table of **FIG. 11** to carry out the FAX transfer.

[0080] In case the communication route is from equipment A→FAX **1**→FAX **2** and to equipment B, the FAX number of FAX **2** is used on the fifth row of the address-**1** column and the sub-address (address-**2**) for the transfer of document data from the FAX **2** to the equipment B in the table of **FIG. 11** to carry out the FAX transfer. Document data is transferred from the FAX **2** to the equipment B over the network, and therefore the sub-address (address-**2**) is the IP address (Internet Protocol address) of the equipment B.

[0081] In case the communication route is from equipment A→FAX **1**→FAX **2** and to equipment B via E-mail, the FAX number of FAX **2** is used on the sixth row of the address-**1** column and the sub-address (address-**2**) for the transfer of document data from the FAX **2** to the equipment B in the table of **FIG. 11** to carryout the FAX transfer. Document data is transferred from the FAX **2** to the equipment B via E-mail, and therefore the sub-address (address-**2**) is the E-mail address of the equipment B.

[0082] Next, the process of step P**42** on the flowchart of **FIG. 13** for sending document data to the receiving equipment B via the determined communication route and communication means of E-mail will be explained. The process is carried out based on the program for E-mail stored on the hard disk of the sending equipment A, with the receiving equipment number being set to the E-mail server.

[0083] The destination mail address is determined with reference to the E-mail address on the seventh row of the address-**1** column in the table of **FIG. 11**. The determined E-mail address is set to the program for E-mail, and image data is transferred to the specified address of the E-mail server. The user of the receiving equipment B will be notified of the delivery of an E-mail, and receive the document data from the E-mail server.

[0084] **FIG. 14** is a flowchart showing the subroutine for making a list of available communication means shown by step P**32** on the flowchart of **FIG. 13**.

[0085] The sending equipment A issue status requests to all equipments connected to the network (refer to **FIG. 8**, Ethernet **94**) which is connected with the sending equipment A. Specifically, it requests the transfer of lists of communication means available for these equipments (step P**45**), and waits for the reception of the lists (step P**46**). On receiving the lists of available communication means from all equipments in the network, the sending equipment A adds its own available communication means to the received lists and provides the lists of communication means that are available for the transfer operation of the equipment A (step P**47**), and returns to the main routine.

[0086] **FIG. 15** is a flowchart showing the processing for the transfer of available communication means list and document data reception implemented by the CPU **51** of the receiving equipment B which is a personal computer **50**B shown in **FIG. 8**. Initially, the CPU **51** receives a telephone call from a sending equipment (step P**51**), and judges whether it is a status request or not (step P**52**).

[0087] On receiving the status request, it issues status requests to all equipments connected to the network (Ethernet **95**) which is connected with the sending equipment B (step P**53**), and waits for the reception of status information (step P**54**). On receiving status information from all equipments, there is provided a list of communication means available on these equipments in the network and a list of communication means available for the self equipment B (step P**55**). The list is transmitted to the sending equipment A (step P**56**), and the operation is terminated.

[0088] Otherwise, in response to the negation of the status request judgement in step P**52**, the processing of FAX reception is implemented (step P**57**), and the operation is terminated.

[0089] **FIG. 16** is a flowchart showing the document data transfer process implemented by the CPU of the FAX **2** in the network shown in **FIG. 8**. The CPU judges whether or not the FAX **2** has received document data and information indicative of the destination from the modem A or FAX **1** (step P**61**). On receiving document data and destination information, it judges whether the destination is an E-mail address or IP address (Internet Protocol address) of a receiving personal computer (step P**62**).

[0090] When the destination information is an E-mail address in step P**62**, the E-mail address is set (step P**63**), the data format is converted so that the document data can be processed by the receiving equipment B (step P**64**), the converted document data is attached to an E-mail (step P**65**), and finally the E-mail is sent to the specified E-mail address (step P**66**).

[0091] In case the judgement step P**62** reveals that the destination information is an IP address, the IP address is set (step P**67**), the document data is sent to the specified IP address based on the file transfer protocol (FTP) (step P**66**), and the operation is terminated. The receiving equipment B is running under the operating system (OS) which can deal with the file transfer protocol (FTP), and it receives the document data and automatically stores the data onto the hard disk of the personal computer.

[0092] Although a list of communication means that are available for communication between the sending equipment and receiving equipment are transacted by using FAX in the above explanation, the list may be transacted via other means, e.g., E-mail.

[0093] Although the communication route selection control program is stored in the hard disk of the personal

computer in the above explanation of the second embodiment, this program may be stored on a floppy disk and loaded with the floppy disk drive of the personal computer into the main memory at the time of processing. This variant scheme is made possible by the provision of a floppy disk drive **56** on the personal computer **50**A and the preparation of a floppy disk **56***f* as shown in **FIG. 8**.

[**0094**] The floppy disk for storing the communication route selection control program may be replaced with a CD-ROM, with a CD-ROM drive being provided on the personal computer obviously.

[**0095**] Although in the foregoing first and second embodiments, the sending equipment inquires of the receiving equipment the available communication means and produces a graphic communication route guidance (shown in **FIG. 4** and **FIG. 12**) at each time of communication, an alternative scheme is to memorize the reply of inquiry and produces the guidance from the stored record for successive communications within a certain period of time. Inquiry of available communication means may be made at certain events, e.g., when the equipment is turned on, or on expiration of a certain time length after turn-on of the equipment, thereby to update the information of available communication means of the receiving equipment.

[**0096**] A conceivable preset destination equipment is an equipment which is registered with the allotment of a one-touch dial number of the usual facsimile unit.

[**0097**] According to the present invention arranged as described above, the user is allowed to choose a communication means and communication route among multiple available means and routes depending on the content of communication, communication speed and communication cost, whereby the user is prevented from being troubled in choosing a communication function or sending information by using a function that is not the best.

What is claimed is:

1. A communication equipment capable of sending information to a receiving communication equipment via a plurality of communication routes, said equipment comprising:

a route finding controller which finds a plurality of communication routes that are available between said sending equipment and said receiving equipment;

a display device which displays the communication routes found by said route finding controller;

an input device used to specify a communication route out of plural communication routes displayed on said display device; and

a transmission controller which transmits information to said receiving equipment through the communication route specified with said input device.

2. A communication equipment according to claim 1, wherein said route finding controller lists up communication routes that are available for said sending equipment and communication routes that are available for said receiving equipment, and extracts communication routes that are available commonly for said sending equipment and said receiving equipment.

3. A communication equipment according to claim 2, wherein said route finding controller sends to said receiving equipment a status request for inquiring communication routes that are available for said receiving equipment, and lists up communication routes that are available for said receiving equipment upon receiving a reply from said receiving equipment in response to the status request.

4. A communication equipment according to claim 1, wherein said route finding controller lists up communication routes that are available for a network connected with said sending equipment and communication routes that are available for a network connected with said receiving equipment, and extracts communication routes that are available commonly for said sending equipment and said receiving equipment.

5. A communication equipment according to claim 4, wherein said route finding controller sends to said receiving equipment a status request for inquiring communication routes that are available for said network connected with said receiving equipment, and lists up communication routes that are available by said receiving equipment upon receiving a reply from said receiving equipment in response to the status request.

6. A communication route selection method for selecting a communication route to be used for communication between a sending equipment and a receiving equipment from among a plurality of communication routes that are available between said sending equipment and receiving equipment, said method comprising the steps of:

a step of finding a plurality of communication routes that are available between said sending equipment and said receiving equipment;

a step of displaying the communication routes found in said route finding step;

a step of detecting the selection of a communication route out of the communication routes displayed in said displaying step; and

a step of sending information from said sending equipment to said receiving equipment through the communication route in said detection step.

7. A communication route selection method according to claim 6, wherein said route finding step comprises the steps of:

a first listing step of listing up communication routes that are available for said sending equipment;

a second listing step of listing up communication routes that are available for said receiving equipment; and

a step of extracting communication routes that have been listed commonly in said first and second listing steps.

8. A communication route selection method according to claim 7, wherein said second listing step comprises the steps of:

a step of sending a status request from said sending equipment to said receiving equipment for inquiring communication routes that are available for said receiving equipment; and

a step of sending back, from said receiving equipment to said sending equipment in response to the status request, reply information indicative of the communication routes available for said receiving equipment.

9. A communication route selection method according to claim 6, wherein said route finding step comprises the steps of:

a first listing step of listing up communication routes that are available for a network connected with said sending equipment;

a second listing step of listing up communication routes that are available for a network connected with said receiving equipment; and

a step of extracting communication routes that have been listed commonly in said first and second listing steps.

10. A communication route selection method according to claim 9, wherein said first listing step comprises the steps of:

a step of sending a status request from said sending equipment to other equipments connected with said network which is connected with said sending equipment for inquiring available communication routes; and

a step of sending back, from said other equipments to said sending equipment in response to the status request, reply information indicative of the available communication routes.

11. A communication route selection method according to claim 9, wherein said second listing step comprises the steps of:

a first inquiry step of sending a first status request from said sending equipment to said receiving equipment for inquiring communication routes that are available for said network connected with said receiving equipment;

a second inquiry step of sending, from said receiving equipment to other equipments connected to said network which is connected with said receiving equipment in response to the first status request, a second status request for inquiring available communication routes;

a first reply step of sending back, from said other equipments to said receiving equipment in response to the second inquiry step, reply information indicative of the available communication routes; and

a second reply step of transferring the information, which has been received in said first reply step by said receiving equipment, to said sending equipment.

12. A communication route selection method according to claim 9, wherein said route display step displays communication routes on a display device provided on said sending equipment.

13. A computer program product in memory for selecting a communication route to be used for communication between a sending equipment and a receiving equipment from among a plurality of communication routes, said computer program product comprising:

route finding control for finding a plurality of communication routes that are available for communication between said sending equipment and said receiving equipment;

display control for displaying the communication routes found by said route finding control;

detection control for detecting the selection of a communication route to be used for communication out of the communication routes displayed by said display control; and

transfer control for sending information from said sending equipment to said receiving equipment via the communication route selected by said detection control.

14. A computer program product in memory according to claim 13, wherein said route finding control comprises:

a first listing control for listing up communication routes that are available for said sending equipment;

a second listing control for listing up communication routes that are available for said receiving equipment; and

route extraction control for extracting communication routes that have been listed commonly by said first and second listing controls.

15. A computer program product in memory according to claim 14, wherein said second listing control comprises:

inquiry control for sending a status request from said sending equipment to said receiving equipment for inquiring communication routes that are available for said receiving equipment; and

reply control for sending back, from said receiving equipment to said sending equipment in response to the status request, information indicative of the communication routes available for said receiving equipment.

16. A computer program product in memory according to claim 13, wherein said route finding control comprises:

a first listing control for listing up communication routes that are available for a network connected with said sending equipment;

a second listing control for listing up communication routes that are available for a network connected with said receiving equipment; and

route extraction control for extracting communication routes that have been listed commonly by said first and second listing controls.

17. A computer program product in memory according to claim 16, wherein said first listing control comprises:

inquiry control for sending a status request from said sending equipment to other equipments connected with said network which is connected with said sending equipment for inquiring available communication routes; and

reply control for sending back, from said other equipments to said sending equipment in response to the status request, reply information indicative of the available communication routes.

18. A computer program product in memory according to claim 16, wherein said second listing control comprises:

a first inquiry control of sending a first status request from said sending equipment to said receiving equipment for inquiring communication routes that are available for said network connected with said receiving equipment;

a second inquiry control of sending, from said receiving equipment to other equipments connected to said network which is connected with said receiving equipment in response to the first status request, a second status request for inquiring available communication routes;

a first reply control of sending back, from said other equipments to said receiving equipment in response to

the second inquiry control, reply information indicative of the available communication routes; and

a second reply control of transferring the information, which has been received by said first reply control of said receiving equipment, to said sending equipment.

19. A computer program product in memory according to claim 13, wherein said route display control displays communication routes on a display device provided on said sending equipment.

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