KAISER NIC FAX KIT
(Machine Code: H132-45, 48)
NIC FAX KIT TYPE 500

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APPENDIX-B

1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

Type
NIC Fax Kit Type 500
(LAN board option for Kaiser 1)

Connectivity
Local area network
Ethernet 100base-Tx/10base-T

Connection
100base-Tx/10base-T direct
connection

Resolutions
Main scan: 200 dpi
Sub scan: 400 dpi, 200 dpi, 100 dpi
NOTE: To use 400 dpi, a LAN bit
switch setting must be changed.

Transmission Time
9 s (through a LAN)
Condition: ITU-T #1 test document
(Slerexe letter)
MTF correction: OFF
TTI: None
Resolution: 200 x 100 dpi
Communication speed: 10 Mbps
Correspondent device: E-mail server
Line conditions: No terminal access

Document Size
The maximum message width is
A4/Letter width by default. To use
B4, A3, or Double Letter width, a
LAN bit switch setting must be
changed.

E-mail File Format
Single/multipart
MIME conversion
Image: TIFF-F (MH) format
DCX format (Rx only)

**Protocol
(supported by TCP/IP protocol)**
Transmission:
IETF RFC821 SMTP procedure
Reception:
IETF RFC1725 POP3 procedure

Data rate
100 Mbps(100base-Tx)
10 Mbps (10base-T)

Remark
The machine must be set up as an
e-mail client before installation. Any
client PCs which are connected to
the machine through a LAN must
also be e-mail clients, or some
features will not work (e.g.,
Autorouting).

Overall
Information

1.2 FEATURES

KEY: O = Used, X = Not Used,

Communication Features - E-mail Transmission	
Action as a transfer broadcaster	O
Batch transmission	X
Broadcasting	O
Closed network	X
Confidential transmission	X
Direct e-mail address entry	O
Double sided document transmission	O
ECM	X
Economy transmission	O
File transfer	X
Forwarding	O
Forwarding mark	O
Immediate transmission	X
Memory transmission	O
Multi-step transfer	O
OMR	X
Page retransmission times	X
Partial image transmission	O
Polling transmission	X
Send later	O
SUB/SID	X
Transfer request	O
Transmission deadline (TRD)	X

Communication Features - E-mail Reception	
Authorized Reception	X
Closed network	X
Confidential reception	X
Center mark	O
Checkered mark	O
Group transfer station	O
Multi-copy reception	X
Manual reception	X
Memory lock	X
Night timer	O
Page separate reception	O
Polling reception	X
Reception time printing	O

Communication Features - E-mail Reception	
Reverse order printing	X
Substitute reception	X
TSI printing	O

Reports - For e-mail	
Error mail notification	O
Error report (mail)	O
Journal	O
Personal code list	O
Transfer result report	O

Others	
LAN fax	O
200 dpi Printing	O
200 dpi Scanning	O
Auto routing	O
Internet fax	O
Internet telephone	X
Protocol dump list (LAN)	O
Ping	O

1.3 NETWORKING

1.3.1 OVERVIEW

Japan

G3 Fax
Machine
011-1-212-555-3456#8888

PSTN

03-3123-4567

NIC Fax

nicfax@xyz.co.jp

Router

Server

Laser Printer

Ethernet

nicfax@abcd.com

name@abcd.com

USA

NIC Fax

name@abcd.com

Laser Printer

Router

Server

Ethernet

nicfax@abcd.
com

nicfax@abcd. com
Personal Code 8888 = name@abcd.com

Internet

Paper -----> Paper
Paper ———> PC display
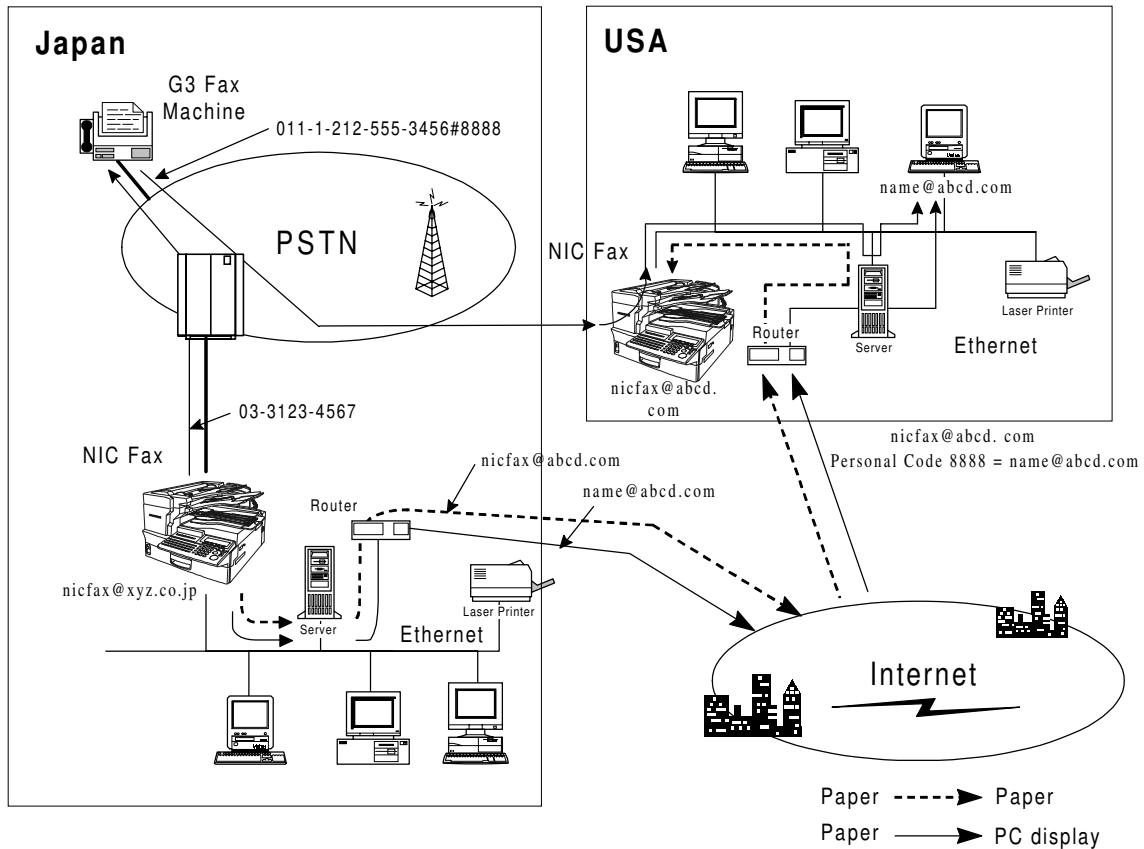
H132V601.WMF

The above drawing outlines some of the network operations that the NIC Fax can support.

The NIC Fax at nicfax@xyz.co.jp receives a G3 fax message from a G3 fax machine inside Japan (dotted line in the diagram). The NIC Fax then relays it to another NIC Fax in the USA. This NIC Fax then passes the message on to a PC (name@abcd.com).

The NIC Fax in Japan can also send the message to the PC in the USA directly, via the internet, by dialing its e-mail address (unbroken line in the diagram). The message will be stored in the network server at the remote end, until the PC picks it up.

The rest of this section outlines each of the network features individually.

1.3.2 LAN FAX

G3 Fax Machine

PC Fax Application

name@abcd.com

G3 Fax Message

PSTN

NIC Fax

G3 Fax Message

NIC Fax

Server

Laser Printer

PC to Fax Machine
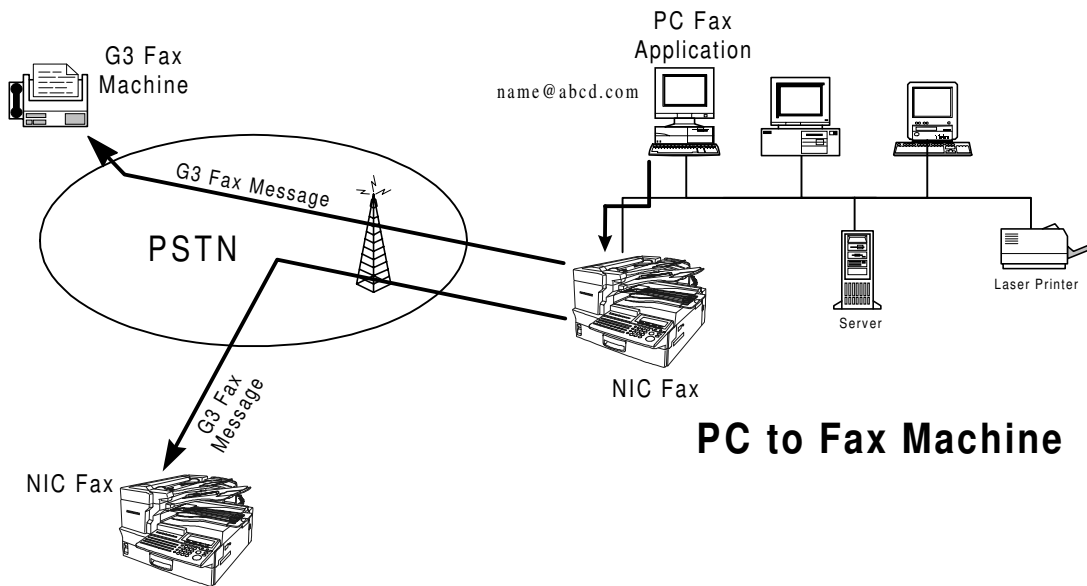
H132V602.WMF

Feature

The LAN fax feature allows a client PC to send a G3 fax message to the NIC fax over the LAN. The NIC fax will then send the fax message to the destination, which could be either a PSTN G3 fax or an e-mail address.

Operation

1. PC fax software and the IC COM Redirector utility must be installed in the client PC in advance. IC COM Redirector must be running.

2. Quick dials, speed dials, and group dials stored in the NIC fax can be used.

Advantages

1. A fax message can be sent by a client PC. The NIC Fax can be shared by all PCs on the LAN as a G3 fax modem and PSTN line.

2. No paper is required at the transmitting side.

1.3.3 200-DPI PRINTER

Overall Information

PC Fax
Application

PC to Paper

NIC Fax

Server   Laser Printer

H132V603.WMF
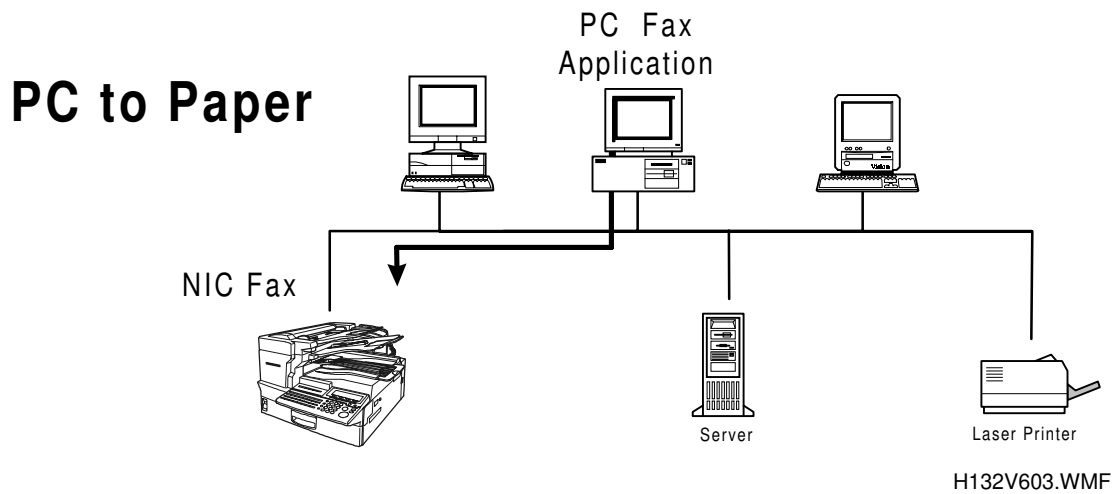
Feature

This provides a convenient but low-resolution LAN printer. The feature is also known as "Convenient Printing".

Operation

1. PC fax software and the IC COM Redirector utility must be installed in the client PC in advance. IC COM Redirector must be running.
2. To print a file, the user dials "0000" with the PC fax application.

Advantages

1. Provides a convenient 200-dpi LAN printer.
2. Computer files can be printed out through a PC-based fax application.

1.3.4 200-DPI SCANNER

Paper to PC

name@abcd.com

NIC Fax
name@abcd.com

Server

Laser Printer

H132V604.WMF
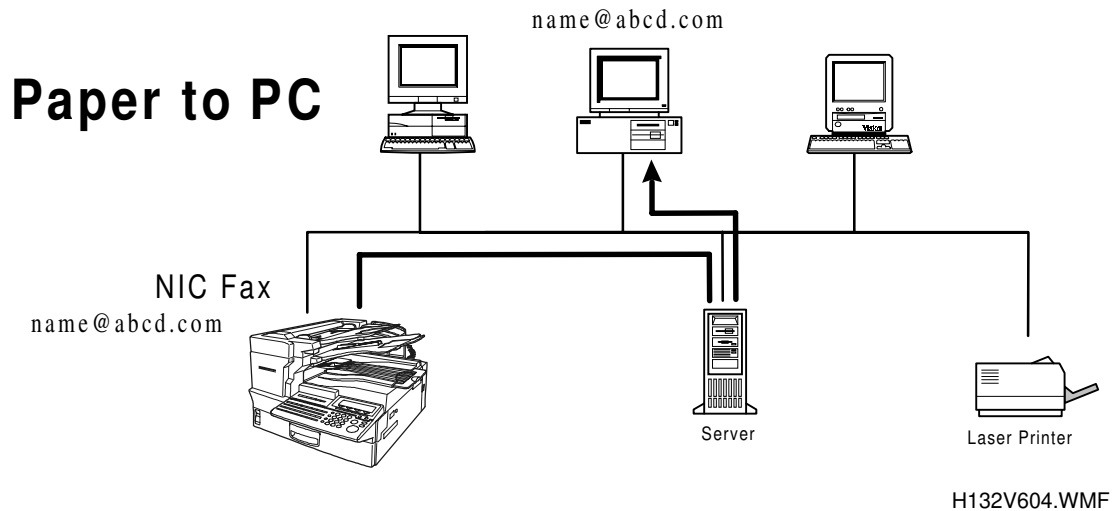
Features

1. This provides a convenient but low-resolution network scanner. The feature is also known as "Convenient Scanning".

2. The NIC fax sends the scanned image to the client PC as an image file attached to an e-mail message.

Operation

The user scans the original at the NIC Fax (not at the PC), and sends it to the e-mail address of the required PC.

Advantages

1. Provides a convenient 200-dpi network image scanner.

2. Images are stored as e-mail in the mail server for the client PC to pick up.

1.3.5 AUTOROUTING
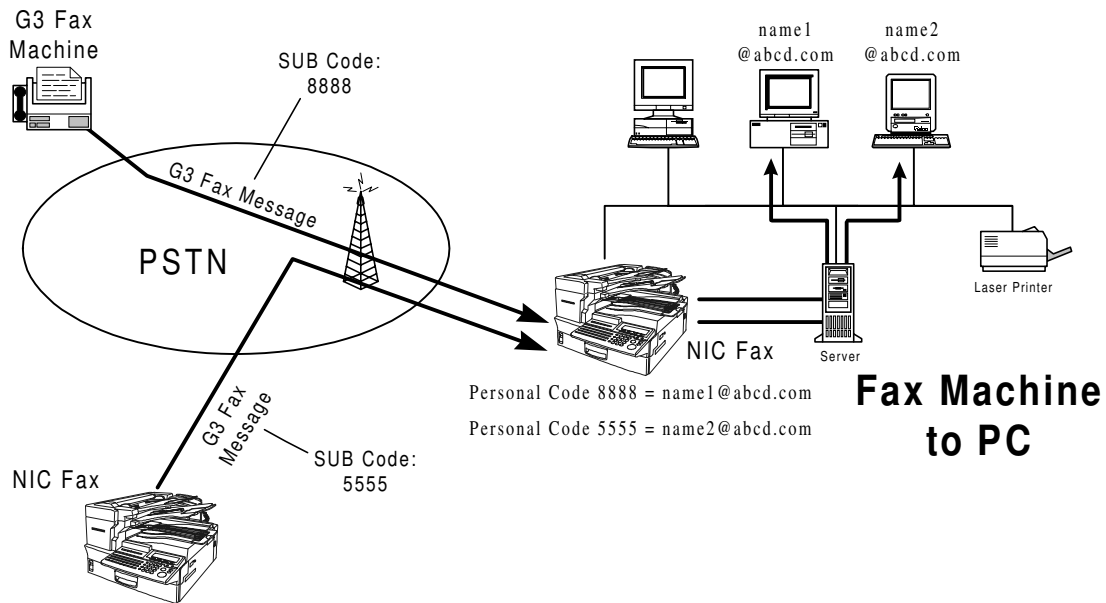
H132V605.WMF

Feature

The NIC fax routes incoming fax messages to client PCs on the same network, based on the code included in the SUB signal.

Operation

1. The sender specifies a sub ID when sending a fax message. This ID is transmitted using the SUB protocol signal.

2. Personal codes are stored in the receiving NIC fax in advance, and associated with e-mail addresses on the same LAN. If the code in the received SUB signal is the same as one of the stored personal codes, the NIC fax routes the incoming message to the address that is stored with that personal code.

   Example: If a received message has a SUB code of 5555, it is forwarded to
            name2@abcd.com

3. The client PC receives the fax as an e-mail message with an image file attached.

Advantages

1. Fax messages are delivered directly to the mail server for the client PC to pick up.

2. No paper is used.

1.3.6 FORWARDING

G3 Fax
Machine

TSI: 1234

PSTN

name1@abcd.com

name2@abcd.com

NIC Fax   Server

Laser Printer

Forwarding by TSI: For 1234, send to name1@abcd.com
Forwarding by RTI: For FRED, send to name2@abcd.com

**Fax Machine
to PC**

RTI: FRED
G3 Fax
Machine
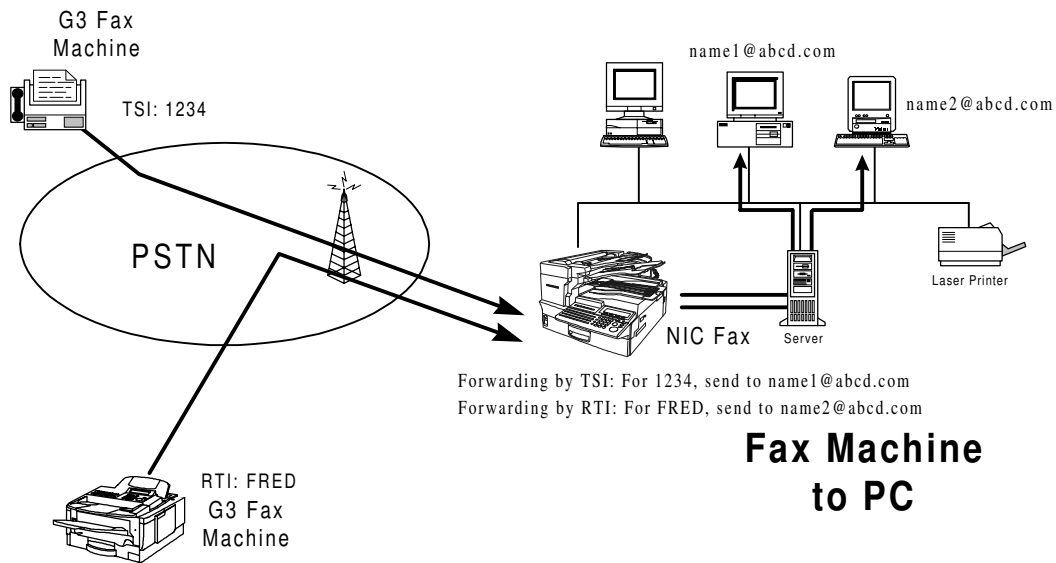
H132V606.WMF

Feature

The NIC fax routes incoming fax messages to client PCs on the same network, based on the contents of the RTI or TSI. In this way, a message from a certain sender can always be forwarded to a certain location.

Operation

1. The sender must have a TSI or RTI programmed.

2. RTIs and TSIs of expected senders are stored in the receiving NIC fax in advance, and associated with e-mail addresses on the same LAN. If the received RTI or TSI is the same as one of those stored, the NIC fax routes the incoming message to the associated address.

    Example: If a received message has an RTI of FRED, it is forwarded to
            name2@abcd.com

3. The client PC receives the fax as an e-mail message with an image file attached.

Advantages

1. No SUB code is required for forwarding (some machines cannot send SUB codes).

2. Fax messages are delivered directly to the mail server for the client PC to pick up.

3. No paper is used.

1.3.7 INTERNET FAX (PAPER TO PAPER)
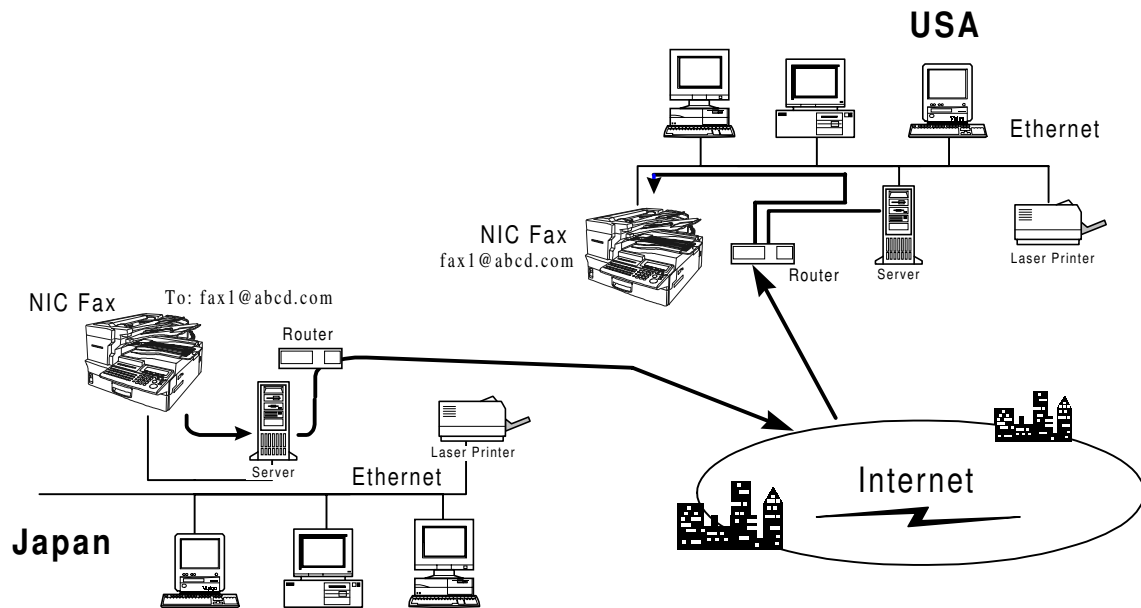
H132V607.WMF

Feature

Sending and receiving fax messages through the Internet.

Operation

1. An e-mail address is specified when sending a fax message.

2. The fax message goes through the Internet to the receiver, and is printed.

NOTE: The time required to send a fax over the Internet depends on the traffic conditions at the time of transmission. Also, the sending machine has no way to know whether the message arrived intact at the other end.

Advantages

Cost-saving

1.3.8 INTERNET FAX (PAPER TO PC)
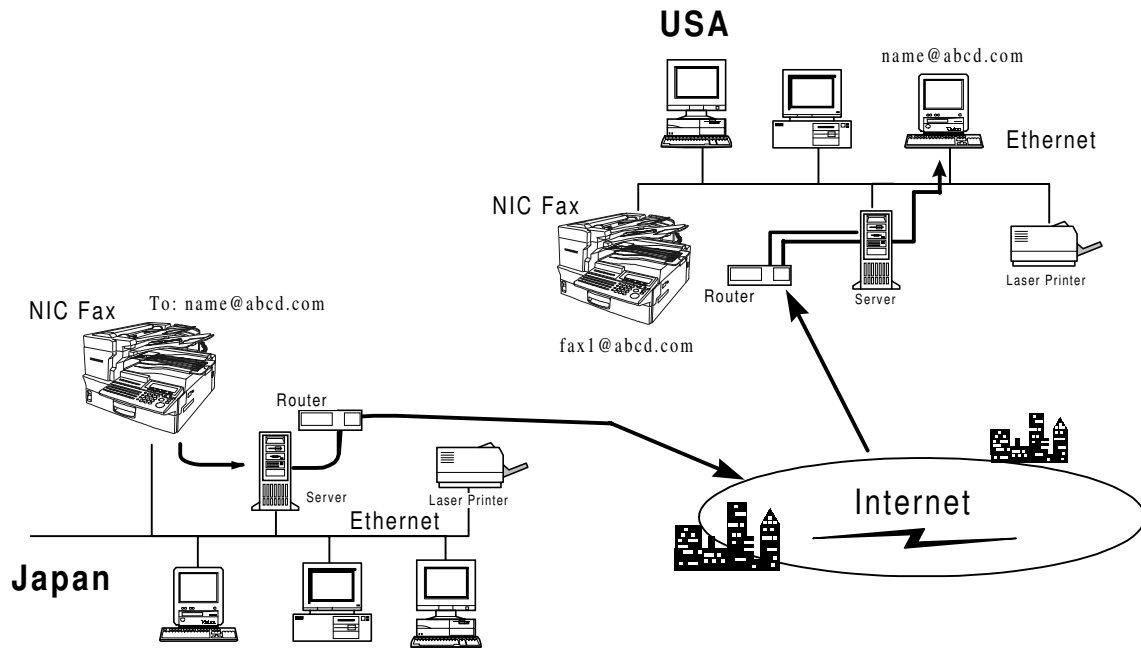
H132V608.WMF

Feature

Sending fax messages directly to a client PC through the Internet.

Operation

1. An e-mail address is specified when sending a fax message.
2. An e-mail message is sent to the client PC with the fax message attached.

Advantages

1. Cost-saving.
2. No paper is used.

1.3.9 TRANSFER REQUEST THROUGH THE INTERNET

USA

name@abcd.com

Ethernet

NIC Fax

Router   Server

Laser Printer

fax1@abcd.com

NIC Fax   To: name@abcd.com

Router

Server   Laser Printer

Ethernet

Internet

Japan
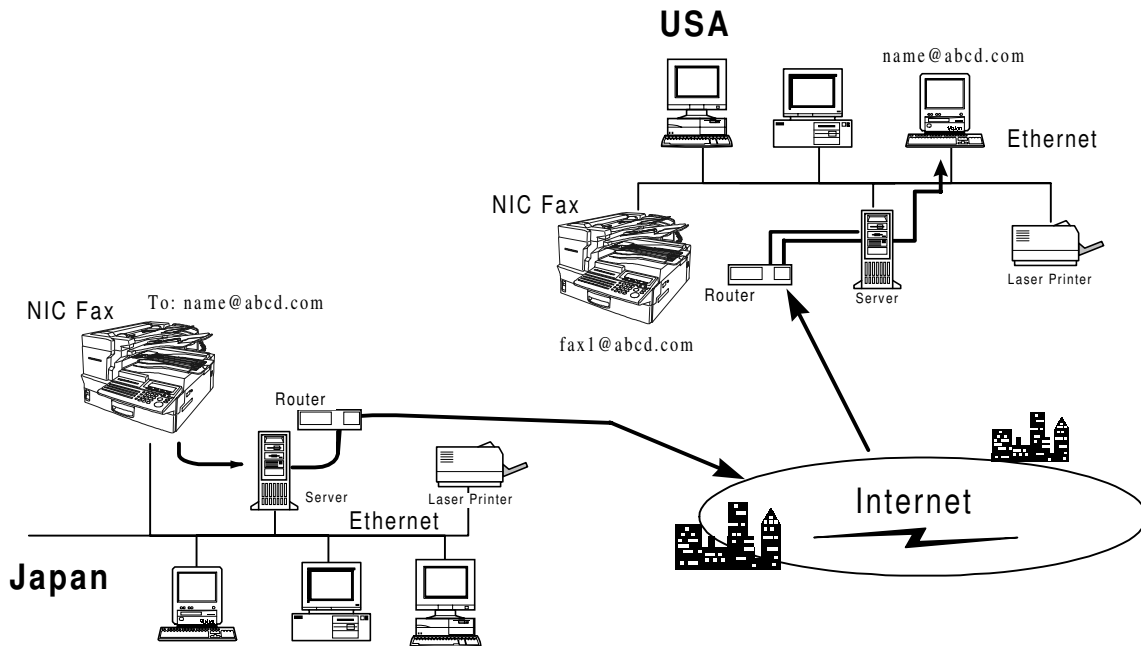
H132V609.WMF

Feature

A fax message can be transferred over the Internet and then forwarded to a G3 facsimile machine, using the NIC fax as a transfer station.

Operation

1. The sender specifies the end receivers using the quick dials, speed dials, and group dials that are stored in the transfer station.

2. The fax message is sent to the transfer station over the Internet and the LAN at the remote location. Then it is transferred to the destination over the local PSTN.

Advantages

Cost savings for long-distance communications.

2.   DETAILED SECTION DESCRIPTIONS

2.1   INTERNET FAX

2.1.1 INTERNET FAX FEATURES

An Internet fax converts fax (hard copy) document data to e-mail format, and transmits the data over the Internet. The e-mail sent by the NIC fax can be received by another NIC fax or a PC. Instead of inputting the telephone number of the destination you want to send to, you input the applicable e-mail address.

Documents are sent as e-mail messages with an attached TIFF-F image (the TIFF-F image is the scanned original). Because of this, a MIME-compatible e-mail reader is required in order to view documents received on a PC. To view an attached image, software that is capable of displaying TIFF-F formatted images is required. NIC fax applications include ICViewer, which can be used to view, edit, and store image data.

The NIC fax must be connected to a LAN and set up correctly in order to use its Internet fax functions.

2.1.2 NIC FAX FEATURES

The Internet fax produced by Ricoh is known as NIC fax.
• TCP/IP communication protocols that support connection to a LAN with e-mail.
• Easy-to-master operations that are identical to those of a standard fax machine.
• Also supports fax transmission and reception over a telephone line.
• NIC Fax Com Redirector (a NIC fax application) can be used to send a fax from a PC on a LAN using a fax application.
• NIC Fax Monitor can be used to check the settings and status of a NIC fax from a PC.
• Received faxes can be directly transferred or mailed to a PC.
• Use of the Internet greatly reduces communication costs.
• Elimination of the use of paper for fax transmission and reception reduces paper expenses.
• The NIC fax does not support installation of the optional PC-Fax Expander Type 500.
• The NIC fax communicates with a server over a LAN. It cannot communicate directly with another party.
• If an error occurs, mail informing of this error (known as 'error mail') will be sent back to the sender. However, if there are some problems on the Internet, error mails may not be received.
• The level of security for Internet communications is low. The use of standard subscriber lines is recommended for confidential communications.
• Voice communications are not supported over a LAN.
• Internet fax delivery might be delayed due to network congestion. Use standard fax communication whenever communication is time sensitive.

The following functions are supported with standard fax transmission, but not with Internet faxing.

Functions Not Supported by Mail Transmission

- Immediate Transmission
- ID Transmission
- Confidential Transmission
- Polling Transmission
- Batch Transmission
- Forwarding of Substitute Reception or Confidential Reception messages (Forwarding to a mail address is not supported.)
- ECM
- Dialling with the Dial Option Key

Functions Not Supported by Mail Reception

- Manual Reception
- ID Reception
- Forwarding Station (Forwarding of Mail is not supported.)
- Confidential Reception
- Polling Reception
- Multi-sort Reception
- Authorized Reception
- Memory Lock Reception
- Specified Paper Cassette Selection

2.1.3 DNS SERVICE

The NIC Fax Kit Type 500 supports the DNS service (Domain Name System: see Appendix B for more details). The NIC Fax can use the Domain Names for the SMTP and POP server instead of the actual IP addresses, if there is a DNS server on the same LAN as the SMTP server, POP server, and the NIC Fax. With models that do not support DNS, the user has to input the actual IP addresses of the SMTP server and the POP server.

2.2 INTERNET MAIL COMMUNICATION

2.2.1 MAIL TRANSMISSION

H132D601.WMF
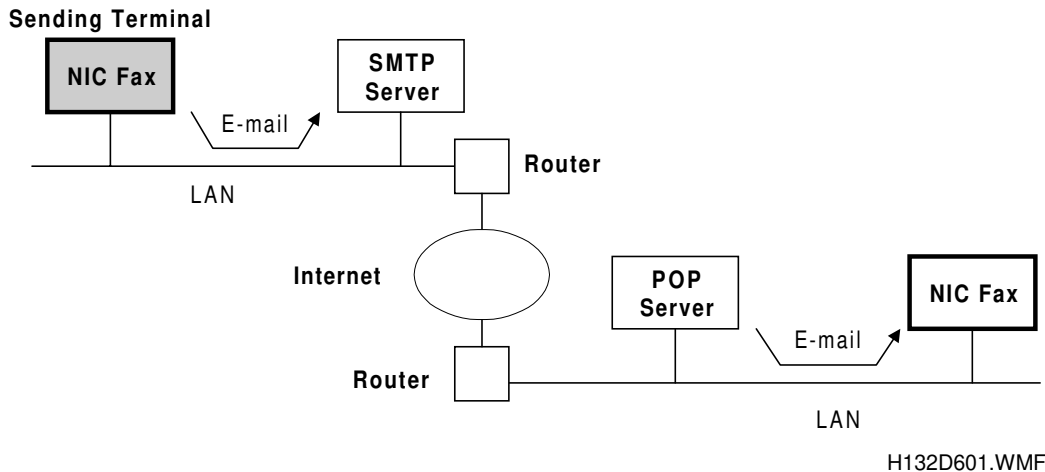
Procedure

Scanned documents are sent as electronic mail (e-mail).

All messages are sent using memory transmission. When a backup mail address (Bcc address) has been stored with the NIC Fax user settings, the machine also sends all the messages to the Bcc address.

All e-mail transmissions are controlled using Simple Mail Transfer Protocol (SMTP) procedures. There must be an SMTP server on the same LAN as the sending machine, or the machine will not be able to send e-mail (it is not necessary to set up an SMTP account).

Data Formats

The scanned data is converted into a TIFF-F formatted file (only MH compression can be used).

The fields of the e-mail and their contents are as follows:

Field	Content
From	Mail address of the sender
Reply-To	Mail address to be replied
To	Mail address of the destination
Bcc	Backup mail address
X-Mailer	ICFAX Version 1.0 (ICFAX is a Ricoh mail utility - IC means Image Communication)
Subject	Fax message no. xxxx (file number) from the TSI (see the notes below this table)
Content-Type	Multipart/mixed Attached files: image/tiff, application/octet-stream
Content-Transfer-Encoding	Base 64
Message Body	MIME-converted TIFF-F (MIME standards specify how files are attached to e-mail messages)

NOTE: 1) The message no. will exist in the subject field if no TSI or RTI is registered.
2) The label of the personal code and RTI will appear at the end of the subject field, if the personal code is entered.
3) The file number can be checked on the Journal.

Errors

An error report will be generated if an error occurs during the communication between the machine and the SMTP server. However, it is possible that the sender will not receive notice of errors that occurred between the SMTP server and the receiving terminal.

The interval between attempts to resend mail to the same destination when an SMTP error occurs is the same as for G3 fax transmission.

NOTE: The interval programmed with LAN switch 0A determines the minimum required interval between mail transmissions when there are no errors.

For what happens when an error occurs when the machine is receiving, refer to the Mail Reception section.

Results

The transmission result is listed on the Journal. The file list for e-mail transmissions is created in the same way as for G3 memory transmissions. The TTI for the mail message includes "Mail" word at the head of the information in the TTI column.

Selectable Options

1. With the default settings, the scan resolution can be either standard or detail. Inch-mm conversion before tx depends on the machine setting. Detail resolution will be used if Fine resolution, unless Fine resolution is enabled with LAN bit switch 07.

2. The requirements for originals (document size, scan width, and memory capacity) are the same as for G3 fax memory tx.

3. The default compression is TIFF-F format.

4. The following options are available when sending a fax by e-mail:
   - SUB code
   - Send later
   - TTI
   - Economy transmission
   - Partial image area scanning
   - Destination check
   - Store double sided

When optional features which are not available for e-mailing are selected, the machine will work as follows.

Example: Using personal code with confidential ID in a broadcasting operation

If the personal code is selected first, e-mail addresses cannot be input, because the e-mail key is disabled.

However, if the e-mail addresses are input first, then the personal code, then the G3 addresses, the mail will be sent to all addresses. However, personal code with confidential ID will only be used for the G3 transmissions in the broadcast.

Detailed Descriptions

Cross reference:
LAN bit switch 01 - Various e-mail transmission settings
LAN bit switch 07 - Acceptable paper widths for sending
LAN bit switch 0A - Minimum interval between e-mail transmissions

2.2.2 MAIL RECEPTION

H132D612.WMF
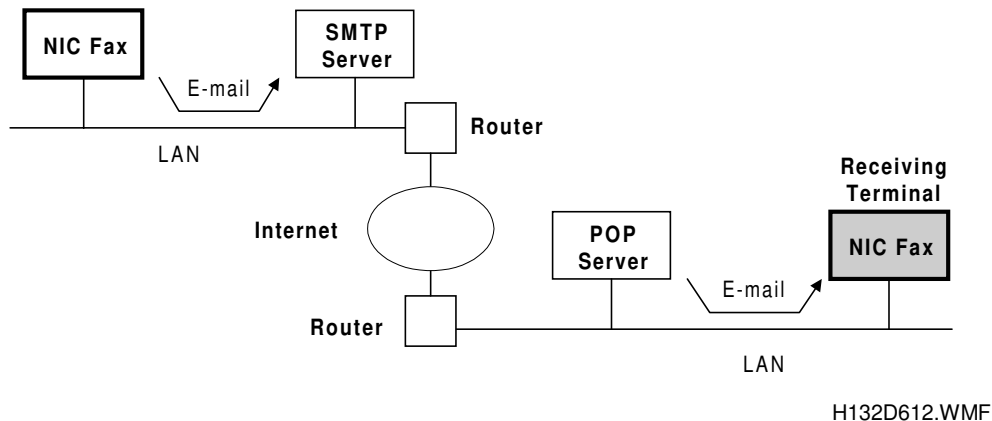
Procedure

There must be a POP (Post Office Protocol) server on the same LAN as the NIC fax, or it cannot receive e-mail, and an account must be set up for the fax machine.

The machine calls the POP server at a regular interval to check if any e-mail has come in (three minutes is the default interval; the interval can be adjusted from 1 minute to 60 minutes in one-minute steps).

If the POP server is holding several e-mails for the NIC fax, the machine picks up the e-mails one at a time. The machine can leave the e-mails on POP server after receiving them (User bit switch 10).

E-mail reception is done in accordance with Post Office Protocol version 3.0 (POP3) procedures.

Errors during reception

Errors during POP3 procedures

When an error of this type occurs, the machine stops receiving and the message stays in the server. After a certain interval, the machine calls the server and starts to receive, starting with the interrupted message. If there is an incompletely received message in the machine's memory, it will be erased.

Abnormal files

When an error of this type occurs, the machine stops receiving and commands the server to erase the message. Then the machine prints an error report out and sends information about the error by e-mail to the sender's address (in the "From" or "Reply-to" field of the message). If there is an incompletely received message in the machine's memory, it will be erased.

The machine prints an error message when it fails to send a message after a certain number of attempts.

Abnormal files are as follows:

1. The e-mail has an unsupported MIME header.

    Supported types of MIME header

Header	Supported Types
Content-Type	Multipart/mixed, text/plain, message/rfc822 Image/tiff, application/octet-stream
Charset	US-ASCII, ISO-2022-JP, Others are determined to be US-ASCII.
Content-Transfer-Encoding	Base 64, 7-bit, 8-bit

2. MIME decoding error

3. The machine cannot recognize the file format as DCX or TIFF-F.

4. The resolution, document size, or compressed type cannot be accepted.

Remaining SAF capacity error

The machine calls the server but does not receive e-mail if the remaining SAF capacity is less than a certain value (the value depends on LAN Switch 08). The e-mail will be received when the SAF capacity increases (for example, after substitute reception files have been printed).

Also, if the capacity of the SAF memory goes down to zero during reception, the machine acts in the same way as when receiving an abnormal file (refer to 'Abnormal files').

Paper Size

1. The maximum paper width for a received message depends on the paper size in the machine (max. A3).

2.   When the machine receives a A3 document but there is only A4 and B4 paper in the machine, the machine reduces the data automatically and prints it on A4 paper.

Printing

1. The machine detects whether it has received a DCX or a TIFF-F format image, then prints it.

2. Text in either US-ASCII or ISO-2022-JP format can be printed. When a line of text is longer than the paper width, the excess data will be deleted.

Multi-part

When a multi-part e-mail message contains several text parts and binary files, the message will be divided with boundaries. Then, each part will be printed separately. If the machine cannot determine where the boundary is, it will generate an error report and print, then send error information e-mail back to the sender.

Cross reference:
LAN bit switch 02 - Various e-mail reception settings

LAN bit switch 08 - Various e-mail reception settings

LAN bit switch 0B - Various e-mail reception settings

User switch 10

Manual e-mail reception

The manual e-mail reception function can be stored in a User Function Key. When this key is pressed, the machine calls the POP server immediately. The timer for automatic POP server calling will be reset when the machine calls the POP server manually.

Example:

The automatic POP server calling interval is 30 minutes.
The machine called the POP server 15 minutes ago.
Now, the machine calls the POP server manually.
The machine will call the POP server automatically after 30 minutes (not after 15 minutes).

User Function Keys

Both Automatic E-mail Reception and Manual E-mail Reception can be stored in User Function Keys.

Automatic E-mail Reception: If the LED is lit, e-mail will be received from the server automatically (every 3 minutes).

Manual E-mail Reception: The machine only receives e-mail when the user function key is pressed. The LED has no function.

Conjunction with the Night Timer function

When the following user parameter switch is changed to 1, the machine does not call the POP server while the Night Timer is in effect.

User switch 16(10 H) bit 4

Whether to receive e-mail when the Night Timer is in effect
    0: Yes
    1: No
The default setting is 0 (even if the Night Timer is in effect, the machine calls the POP server automatically, but does not pick up the mail).

Exception

If the Automatic Mail Reception function is stored in a User Function Key and switched on (by pressing that key to light the LED), the above bit switch setting is ignored. This means that the NIC fax will call the server even when in Night Timer mode, but it will not receive any mail.

2.2.3 MAIL BROADCASTING (E-MAIL AND G3 FAX ARE COMBINED)
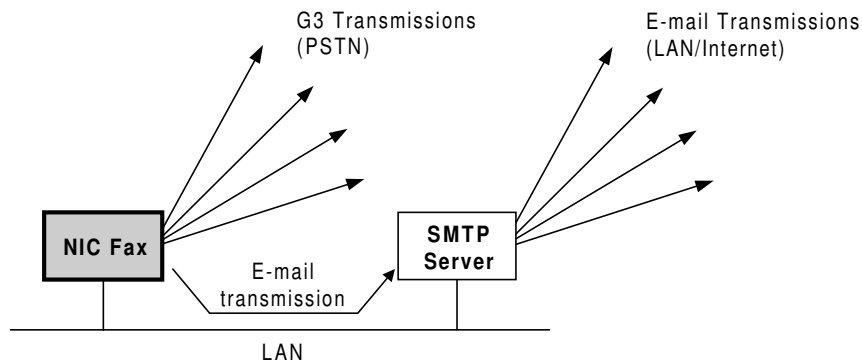
H132D602.WMF

The machine can send the same message to several destinations in one operation. Some destinations can be G3 fax and some can be e-mail. For the G3 fax transmissions, each address has to be dialled separately. However, all the e-mail addresses can be sent with the message to the SMTP server in one transmission. The SMTP server then sends the message to each destination.

The following example for broadcasting to three e-mail destinations and two G3 fax destinations shows how G3 fax messages are each sent individually, but the e-mail destinations are all sent to the server at the same time.

- Order of inputting the addresses at the operation panel
  G3 fax (1) - mail (1) - G3 fax (2) - mail (2) - mail (3)
- Order of transmission
  G3 fax (1) - mail (1), (2), (3) - G3 fax (2)

The SMTP server cannot broadcast the message if a feature included individual information for each terminal in the transmitted data (such as label insertion). If this type of feature was used, the machine sends the e-mails to the server one by one.

With the default settings, up to 250 destinations (including both e-mail and G3 fax) can be dialled for one broadcast. The maximum number of e-mail destinations in a broadcast depends on the mail server's limits.
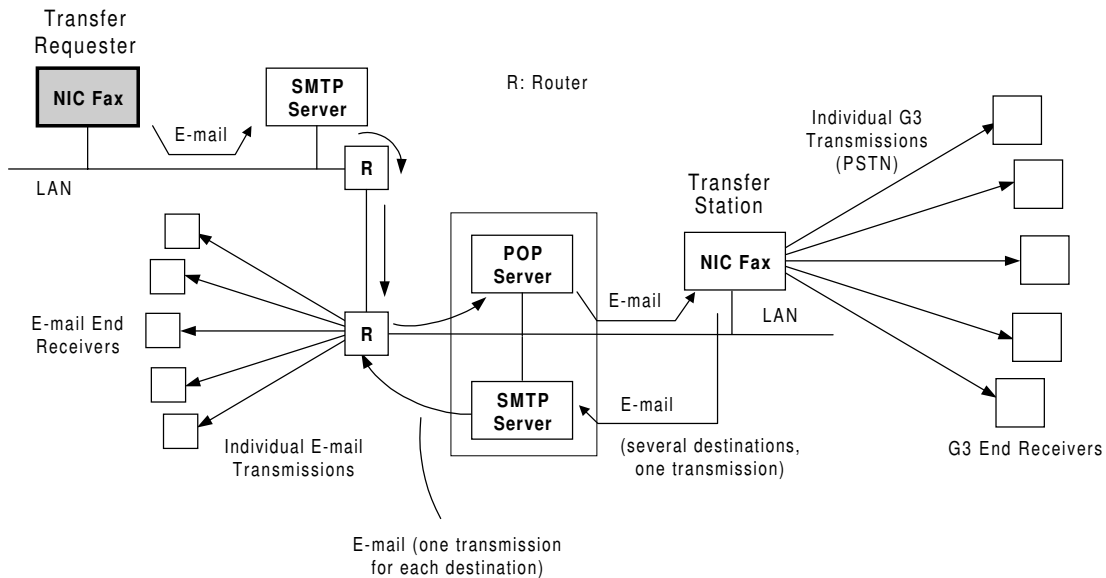
Cross Reference:
Bit 2 and Bits 5 to 7 of LAN bit switch 01 - Various e-mail transmission settings

Broadcasting will not work if batch transmission is disabled with user switch 06.

2.2.4 TRANSFER REQUEST

Operation at the Transfer Requester

Request by Mail

H132D603.WMF

The requesting terminal dials the transfer station, and requests it to transfer the message to end receivers stored as quick dials, speed dials, and group dials in the transfer station. A quick dial number is indicated by a "#" and two digits, a speed dial is indicated by "#", "*", and two or three digits, and a group dial is indicated by "#" and "**" and two digits.

The machine can request transfer to a maximum of 30 destinations for each transfer station. The destinations can be a mixture of e-mail and G3 fax addresses.

The transfer request goes to the SMTP server as an e-mail message. The quick/speed/group dials (and the ID code) are included in the mail body field of the e-mail as text. The message arrives at the POP server of the transfer station.

The transfer station sends the message to the end receivers (see Operation at the Transfer Station for details).

The transfer station sends back a transfer result report. The original may be attached to the transfer result report, depending on the G3 settings of the fax machine. For transmissions to e-mail end receivers, the transfer result report only indicates whether the message was successfully transmitted from the transfer station to its SMTP server.

When making a transfer request, the machine can send the same message to more than one transfer station (each transfer station may transfer the message to a maximum of 30 destinations). All addresses dialled by the requesting terminal must be transfer stations.

The fields of the e-mail and their contents are as follows:

Field	Content
From	E-mail address of the requesting terminal
To	Destination address (transfer station's address)
Bcc	Backup mail address
X-Mailer	ICFAX version 1.0
Subject	Fax Message No. xxxx (file number) from theTSI
Content-Type	Multipart/mixed Text/Plain (for a text part), image/tiff or application/octet-stream (for attached files)
Content-Transfer-Encoding	Base 64
Mail body (text part)	RELAY-ID-: xxxx (xxxx: 4 digits for an ID code) RELAY: #01#*01#**01….
Message body	MIME-converted TIFF-F or DCX

Request by G3 Fax
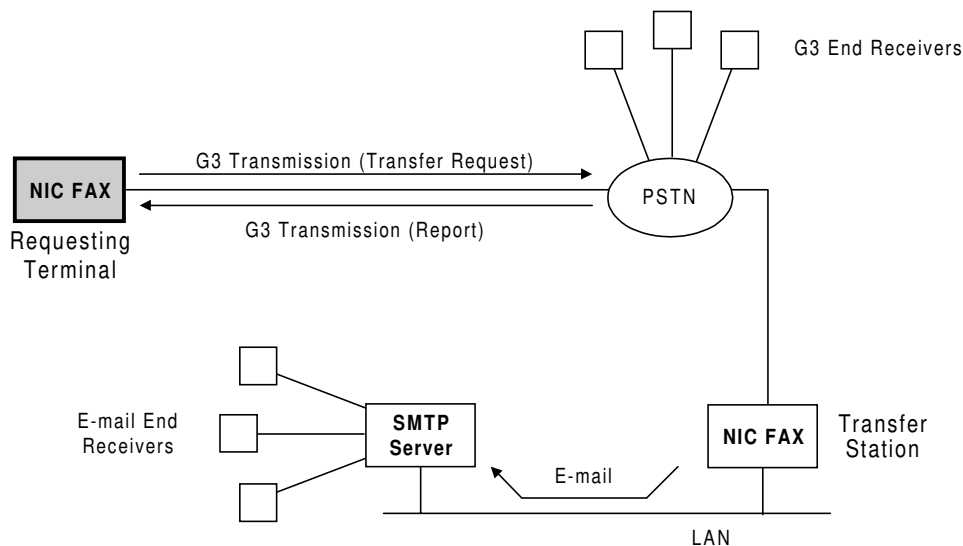
H132D604.WMF

The procedures are the same as for a normal G3 fax machine.

The requesting terminal dials the transfer station, and requests it to transfer the message to end receivers stored as quick dials, speed dials, and group dials in the transfer station.

Using NSF, the machine sends an ID code and the machine's own telephone number. Up to 30 end receivers can be requested.

End receiver destinations can also be selected using tonal signals, in the same way as for other recent fax models. E-mail address can also be selected in this way, as end receivers and as the destination for receiving the transfer result report.

The receiving NIC fax machine receives the transfer request on the PSTN connection. It then handles the transfer request in the same way as explained in "Request by Mail'.

Operation at the Transfer Station

Request by Mail
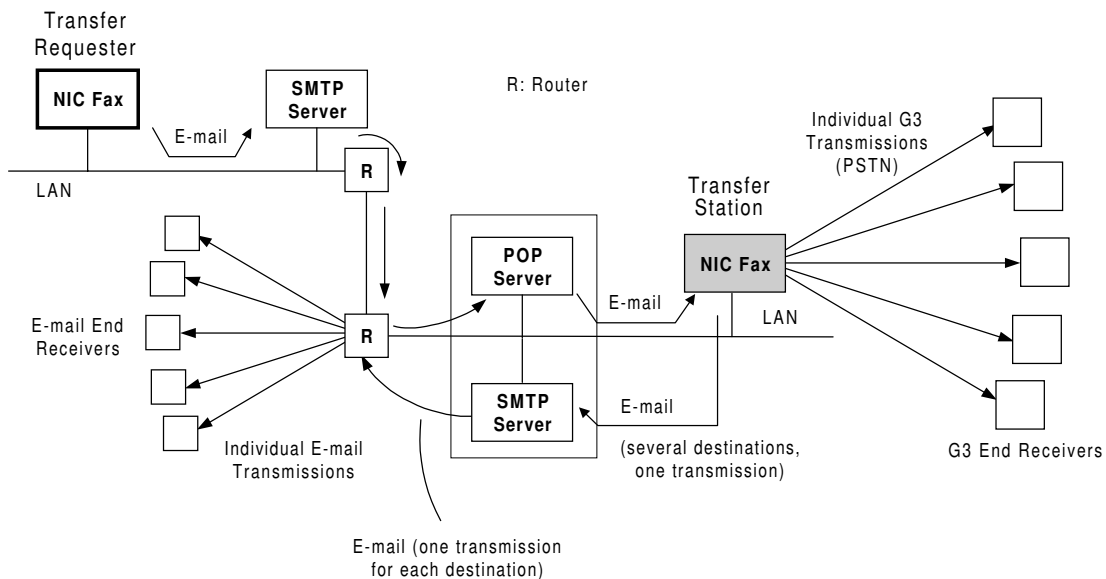
H132D605.WMF

The NIC fax polls the POP server at regular intervals, as mentioned in a previous section. If a transfer request has come in, it receives the e-mail from the server, then sends the message to the end receivers by G3 fax or e-mail, depending on the type of end receiver address.

The NIC fax sends each G3 fax as an individual transmission. However, for the e-mail, the NIC fax sends the message to the SMTP server once, and the server broadcasts the message to the e-mail end receivers one at a time.

The transfer station sends back a transfer result report to the address in the From field of the received e-mail. If an administrator's address is registered, the result report is also sent to that address. The original may be attached to the transfer result report, depending on the G3 settings of the fax machine.

For transmission to e-mail end receivers, the transfer result report only indicates whether the message was successfully transmitted from the transfer station to its SMTP server (the transfer station does not know what happens to the messages on the way to the end receivers).

If a communication error occurs between the machine and the SMTP server during result report transmission, the machine prints the result report.

Cross reference:
LAN bit switch 03 - Transfer station settings

Request by Fax

G3 End Receivers

G3 Transmission (Transfer Request)

G3 FAX

PSTN

G3 Transmission (Report)

Requesting
Terminal

Detailed
Descriptions

E-mail End
Receivers

**SMTP
Server**

NIC FAX

Transfer
Station

E-mail

LAN
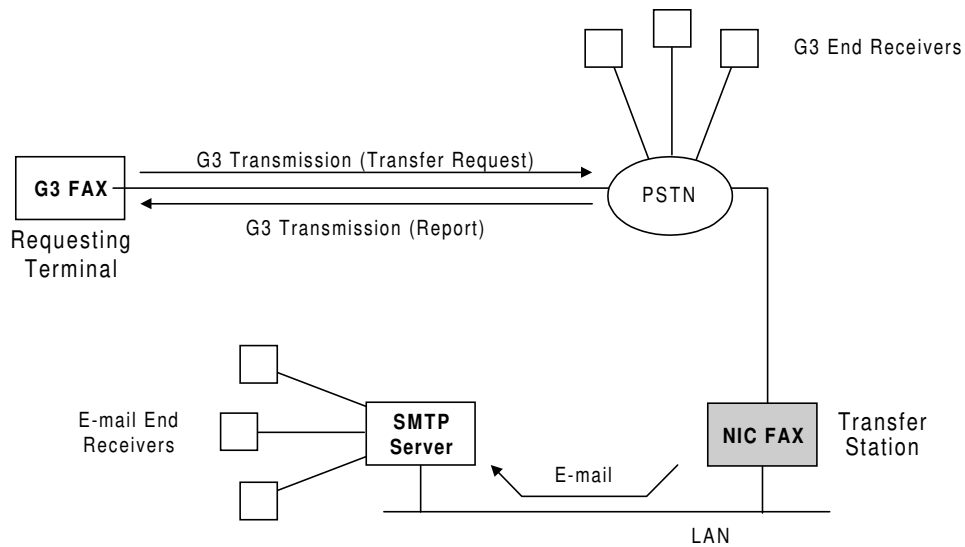
H132D606.WMF

When the machine receives a transfer request by G3 fax, it sends the message to the various e-mail and G3 end receivers in the same way as for a request by mail.

The machine sends back the transfer result report to the requesting terminal's telephone number, which it specified in the NSF signal. The machine prints the result report if it cannot be sent.

The NIC Fax can accept end receiver destinations and transfer result report destinations that were sent from the requester as DTMF tones. This applies for e-mail or PSTN G3 addresses.

Transfer Result Reports for Multi-step Transfer

If All Links are by Mail

After it has passed on the transfer request to the next transfer station, each transfer station sends a transfer result report back to the previous transfer station in the chain by e-mail.

The bottom part of the drawing shows details of the route from Transfer Station A back to the requesting machine.
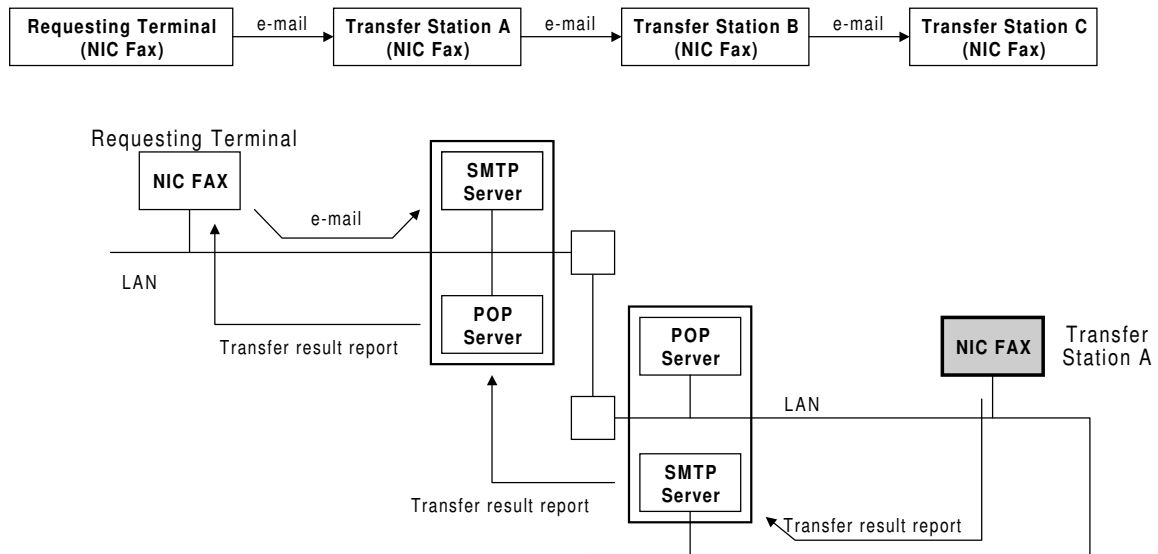
H132D607.WMF

The procedure is as follows.

1. The requesting terminal requests transfer station A to transfer a message.

2. Transfer station A passes the request on to transfer station B.

3. Transfer station A sends a transfer result report back to the requesting machine.

4. Transfer station B passes the request on to transfer station C.

5. Transfer station B sends a transfer result report back to transfer station A.

6. The broadcasting station (transfer station C) sends the message to its SMTP server (e-mails) and to the G3 destinations.

7. Transfer station C sends a transfer result report to transfer station B (for e-mail end receivers, it only indicates whether the message was successfully passed on to transfer station C's SMTP server).

NOTE: The requesting machine's own telephone number is not included in a transfer request message by e-mail, so the transfer station at the end of the chain cannot send a report back directly to the requesting machine. The requesting terminal only receives a report of how the communication went between transfer stations A and B.

If Some Links are G3 Fax

This example shows that even if there is only one e-mail link in the chain, the transfer result report from the final transfer station cannot get back to the requesting terminal.

(The bottom part of the drawing shows details of the route from Transfer Station A back to the requesting machine.)
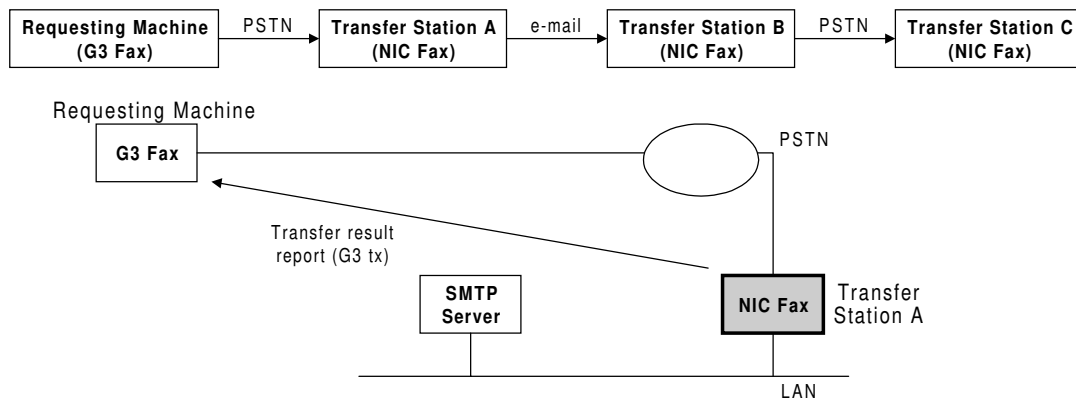
H132D608.WMF

The procedure is exactly the same as for a request by e-mail, as described on the previous page.

However, if there are two or more consecutive PSTN links in the chain, the transfer station at the end of the PSTN chain will be able to send a transfer result report back to the machine at the start of the PSTN chain.

For example, if only the link between transfer stations B and C is e-mail, transfer station B will be able to send a report all the way back to the requesting terminal.

Example of a Transfer Request and Result Report
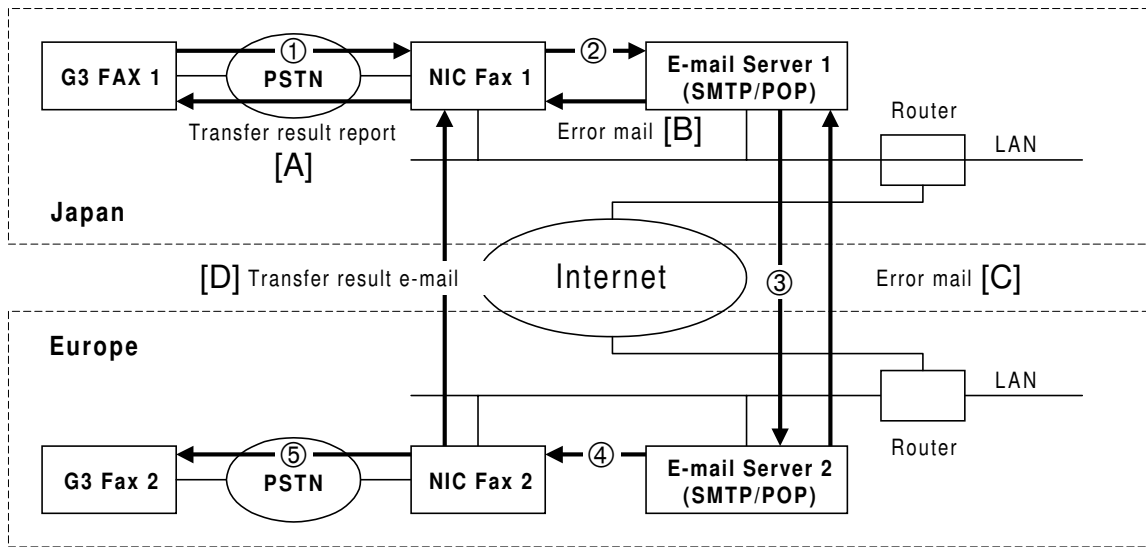
H132D609.WMF

The steps of the transfer request are as follows:

1. G3 Fax 1 sends a transfer request to NIC Fax 1 by G3 fax (① in the diagram).

2. NIC Fax 1 sends e-mail to E-mail Server 1 (② in the diagram).

3. E-mail Server 1 sends e-mail to E-mail server 2 (③ in the diagram).

4. E-mail server 2 sends e-mail to NIC Fax 2 (④ in the diagram).

NOTE: Steps 2 to 4 assume that NIC Fax 1 sends the transfer request to NIC Fax 2 by e-mail, and not G3 fax.

5.   NIC Fax 2 sends a G3 fax message to G3 Fax 2 (⑤ in the diagram).

The steps for sending the transfer result report and any mail reporting errors is as follows:

1. NIC Fax 1 sends a transfer result report [A] to G3 Fax 1 after ① in the diagram.

2. When an error occurs at ③, e-mail server 1 sends e-mail reporting an error [B] to NIC Fax 1. Error mail is also sent to the administrator if the address has been registered in NIC Fax 1.

3. When an error occurs at ④, e-mail server 2 sends e-mail reporting an error [C] to NIC Fax 1. Error mail [C] is also sent to the administrator if the address has been registered in NIC Fax 1.

4. NIC Fax 2 send a transfer result report [D] to NIC Fax 1 through e-mail server 1 and e-mail server 2 after transferring the message to the end receivers (after ⑤ in the diagram).

2.2.5 AUTOROUTING
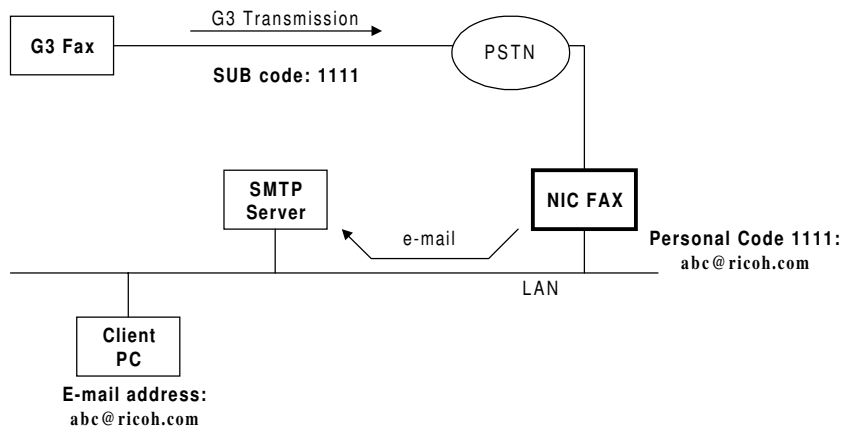
H132D611.WMF

When a G3 fax message is received with a SUB code (max. 20 digits), the machine compares this SUB code with the Personal Box SUB codes stored in the machine with e-mail addresses. If there is a match, the machine routes the message to that e-mail address by e-mail.

There can be only one destination. If there is no destination attached to the SUB code of the personal box, the incoming message is kept in the fax machine's SAF memory.

A communication failure report will be printed if a transmission error occurs between the machine and the SMTP server.

The RTI or CSI of the forwarding machine is indicated in the subject field of the forwarded e-mail. The format is "Fax Message N.xxxx from RTI (or CSI)".

Cross Reference:
LAN bit switch 04 – Autoroute

Please refer to the main fax service manual for details.

2.2.6 TRANSFER BOX

When a G3 fax message is received with a SUB code, the machine compares this SUB code with the Transfer Box SUB codes stored in the machine with e-mail addresses. If there is a match, the machine transfers the message to that e-mail address by e-mail.

Up to 5 destinations, including both e-mail and G3 fax addresses, can be stored for one Transfer Box. There must be at least one destination.

2.3 LAN FAX TRANSMISSION

H132D613.WMF
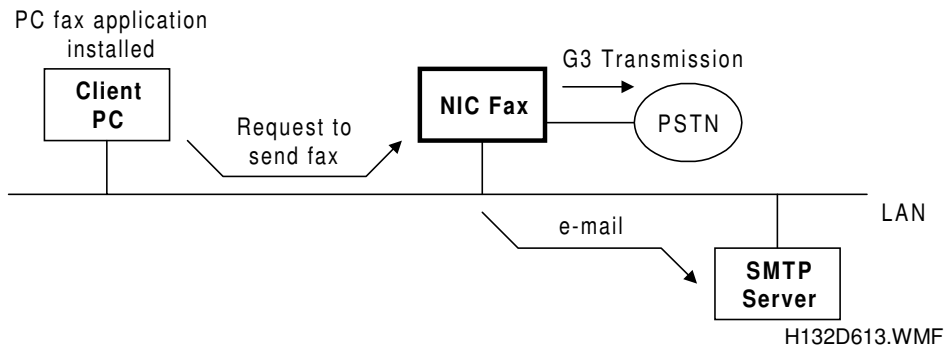
With the LAN Fax feature, a client PC on the same network can send a G3 fax to the NIC Fax using the LAN and ask it to send the fax by G3 or by e-mail. PC fax software must be installed on the PC.

The client PC cannot receive G3 fax messages through the NIC Fax.

1. Required hardware and software - the Com Redirector utility can only work with the following (Com Redirector is a Ricoh utility; it is explained later in this section)
    1) Hardware
       • IBM PC/AT compatible, running Windows 95/98, Windows NT4.0

    2) Acceptable fax software
       • Windows 95 standard fax application (MS-FAX)
       • Bitware 3.24.06 (Cheyenne)
       • Win Fax Pro 9.0 (Delrina)
       • Sopwith 1.1(12)
       • WinPhone 2.0 (BVRP)

2. Operation
    1) Com Redirector must be installed in the client PC.
    2) Quick dials, speed dials, and group dials registered in the NIC Fax and numbers stored in the PC fax application can be used as destinations.
    3) E-mail addresses in the quick dials, speed dials, and group dials can be used.
    4) When the PC fax application dials "0000", the NIC Fax prints the message instead of transmitting it (this is the 200-dpi printing feature, also known as "Convenient Printing").
    5) Communication failure reports and Journals printed by the machine cannot be delivered to a PC.
    6) The range of client PCs that can use the NIC Fax can be controlled by programming the Access Control and Access Mask parameters. These are user and service adjustments. If "0.0.0.0" is stored as the "Access Control" setting, any PC can use the NIC Fax for a LAN Fax operation.
    7) Two PCs can connect to the machine at the same time. The third PC will receive a busy signal from the machine.

3. Com Redirector
    The fax message made by the PC fax application is sent to a COM port in the
    PC and routed to the NIC Fax over the LAN by the Com Redirector utility. The
    user must do the following to install Com Redirector in a Windows 95 system.

    1) Install IC Fax Port using the Windows 95 hardware wizard.
    2) Connect IC Fax Port to a COM port using the modem properties settings. An
       appropriate COM port is selected automatically.

Cross Reference:
LAN bit switch 06 - LAN Fax settings
LAN bit switch 09 - LAN Fax settings

Detailed Descriptions

2.4 IC FAX APPLICATION UTILITIES

The IC Fax Application is bundled with the machine. It includes the following utilities: NIC Fax Monitor, Com Redirector and IC Viewer.

Com Redirector was discussed in the LAN Fax Transmission section. The others are explained below.

2.4.1 NIC FAX MONITOR

With this utility, the status of the machine can be monitored at a client PC, and some user data can be programmed.

An unlimited number of users can access the initial NIC Fax Monitor screen. Five users can display the Memory Status, Journals and Address Book at the same time. However, only one person can access as the administrator at one time.

Monitoring and Programming

Network connection status

The communication status is displayed on the NIC Fax Monitor initial screen while the machine is connecting to the LAN and/or the telephone network.

Error status message

Error status is displayed on the NIC Fax Monitor initial screen. The highest priority status is displayed at the top of the status window.

Priority	Messages
1	Please call a service engineer
2	Network error
3	Communication error
4	Close the cover
5	Clear copy
6	Clear original
7	Load Paper
8	Set the toner cartridge properly
9	Replace the toner cartridge
10	Toner near empty

Memory Status

The file lists of awaiting transmissions, received documents and Auto Documents are displayed in the memory status window.

Journals

The Journal of the fax machine is displayed.

Addresses and fax settings

The utility has a user mode and an administrator mode. A password is needed to enter administrator mode. User mode can be used to view the data, but to program the data, administrator mode must be used.

Detailed Descriptions

Quick dials
Speed dials
Group dials
Multi-step Transfer Groups
Boxes
Forwarding Addresses
Forwarding Options
Monitor Settings
Fax Setup (Admin)
Password for administrator

Cross Reference:
LAN bit switch 05 - LAN Fax settings

Backing up and Restoring memory data

It is possible to make a backup file of the following user data and restore them to the machine in the administrator mode.

• Quick dials
• Speed dials
• Group dials
• Multi-step Transfer groups
• Boxes
• Forwarding addresses

NOTE: 1) Restore is intended for use to recover from a hardware malfunction. Restoring data for any other reason can cause communication problems. However, the user data must be deleted before trying to restore (see note 2).
2) Restore can be used only when there is no user data stored in the memory of the machine. Check that there is no data in the memory before trying to restore data.
3) Files generated by NIC Fax Type 140 are incompatible.

Password

The administrator password is stored in the memory on the machine. Even if NIC Fax Monitor is uninstalled and installed again in the PC, the administrator password cannot be erased. If a user forgets the administrator password, enter the service mode of NIC Fax Monitor to use the service password "rifmaint", and then change the password to use the service password as the current password.

A new password can be stored as follows.

• Use "rifmaint" as the administrator password for the utility.
• Change the password using "rifmaint" as the current password.

"rifmaint" is always available even after a new password is stored.

NOTE: Do not inform the service mode password to any customers.

System Log (Service mode)

The LAN protocol dump list is displayed when in service mode. The protocol logs between the POP/SMTP server and the NIC Fax unit are stored in the 16-Kbyte memory in the base machine (not on the NIC Fax board), and NIC Fax Monitor can display about 8 Kbytes of the protocol logs.

View the log by starting NIC Fax Monitor, then selecting System Log in the Settings menu.

The protocol log can be stored as a text file in the client PC hard disk by pressing the "Save" button at the bottom of the System Log window. The file is named "syslog.txt" and stored in the same directory as the NIC Fax Utilities.

Cross Reference:
LAN – Log dump in service mode (Section 4). This has 16 kbytes for storing protocol logs.
Appendix C – This contains information that may be useful when looking at these logs.

CAUTION: Do not change any settings in the System Log window. The settings are for the designer debug functions. If you change any settings, NIC Fax Monitor will not work correctly.
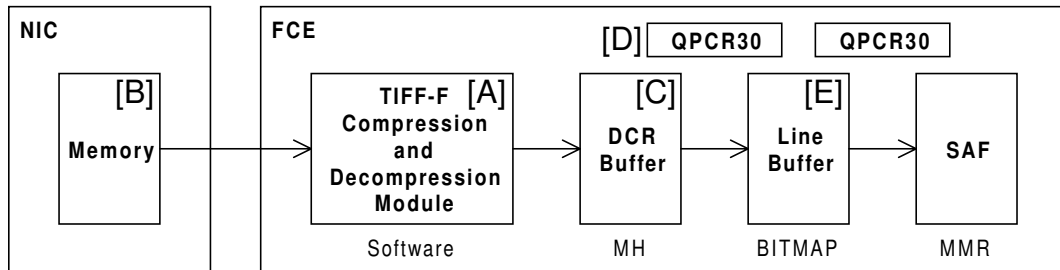
2.4.2 IC VIEWER

The fax message file attached to an e-mail message is in either TIFF-F or DCX format. It can be opened, edited, and saved with the viewer software.

2.5 IMAGE DATA PATH

2.5.1 TIFF-F FORMAT

Reception

H132D614.WMF

The software module [A] receives TIFF-F data from the memory [B] on the NIC board. After decompression, the directory information for the data (resolution, file size) and image data are transfered to the DCR buffer [C] in blocks. The data is then MH compressed.

The MH compressed image data in the DCR buffer is decompressed to bitmap data in the QPCR30 [D] and transfered to the line buffer [E]. The data is MMR compressed in the QPCR30 then stored in the SAF.

Transformation
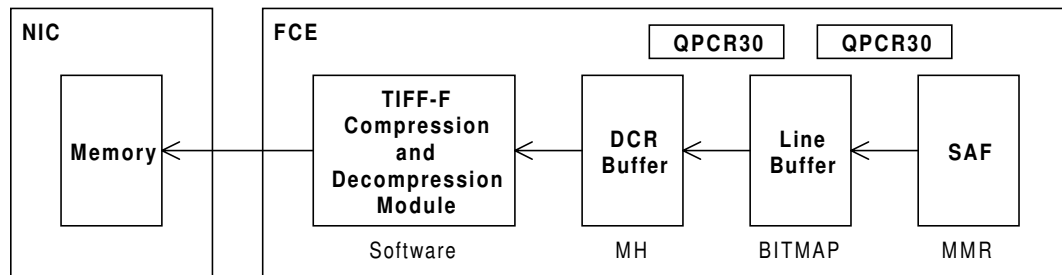
H132D615.WMF

Data from the SAF is decompressed into bitmap data in the QPCR30 and stored in the line buffer. Then, it is MH compressed in the QPCR30 and transfered to the DCR buffer.

The software module makes a TIFF-F formatted file with directory information from the image data, then transfers this file to the memory on the NIC board.

NOTE: The TIFF (Tagged Image File Format) was developed by Aldus and Microsoft as an extendable common file format for the exchange of image files.

In order to increase the portability of TIFF files, various classes of TIFF files have been defined in order to clarify the requirements of readers and writers to ensure compatibility.

Class F TIFF files are used for the exchange of fax images and are a subset of Class B (bi-level or black & white) TIFF images.

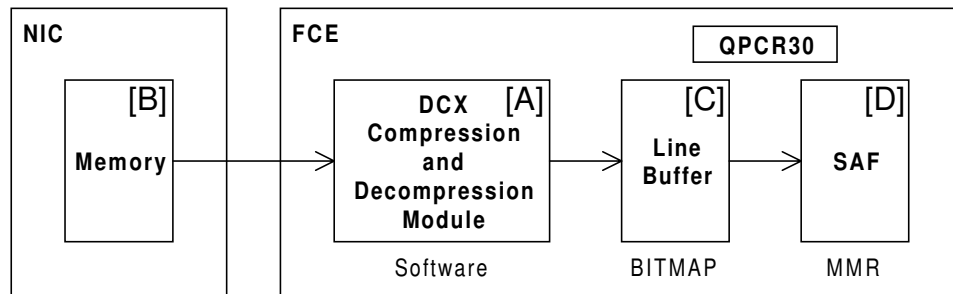MH, MR, and MMR compressions can be used to make a TIFF-F file. This machine uses MH compression.

2.5.2 DCX FORMAT

Reception

H132D616.WMF

The software module [A] receives DCX data from the memory [B] on the NIC board. The DCX file is divided into PCX images (one PCX image for each page). The data is decompressed into bitmap data, then transferred to the line buffer [C].

The data is MMR compressed in the QPCR30, and stored in the SAF [D].

NOTE: The DCX format was developed by Microsoft. It is an enhancement to the PCX format that allows multi-page images.

2.6 NIC BOARD
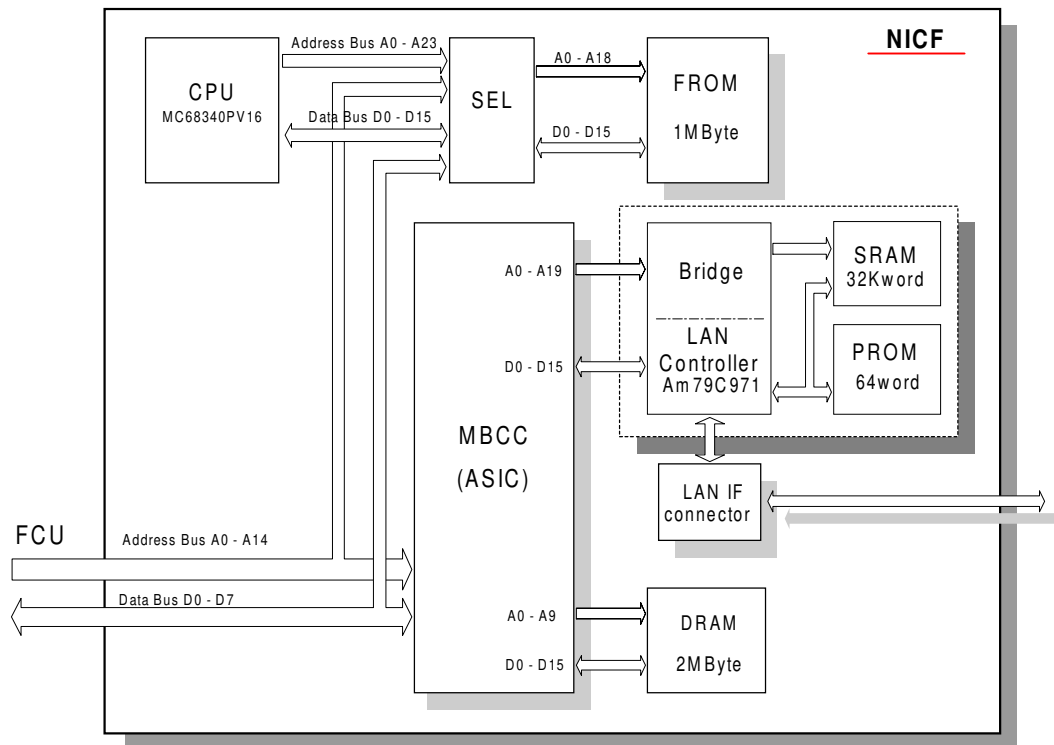
H132D607.WMF

The NIC controls protocols for communication with a LAN and for handshaking with the FCU. The NIC connects to the 100base-Tx/10base-T circuit automatically. The NIC also converts data to a MIME format for e-mail.

The machine supplies stand-by DC power during energy saver mode.

- CPU (MC68340):32-bit CPU to control the NIC board.
- DRAM: 16-Mbit DRAM for main memory.
- FlashROM: 8-Mbit Flash ROM for the software. It can be up-dated by IC Card.
- EEPROM: 1-Kbit EEPROM for the MAC address and the other LAN parameters.
- SRAM: 256-Kbit x 2 SRAM for FIFO buffer for network data.
- LAN Controller (Am79C971): LAN interface

- LED Array -

	Lit	**Not lit**
LED1	The NIC board is working normally	The NIC board is not working normally
LED2	100base-Tx	10base-T
LED3	Full duplex mode	Half duplex mode
LED4	Connected to a LAN	Not connected to a LAN

-   Signal Table -

Pin Address	Signal	Remarks	Pin Address	Signal	Remarks
A1	N.C.	Not connected	B1	PRGMOD	Program mode
A2	N.C.	Not connected	B2	N.C.	Not connected
A3	COM1	GND	B3	N.C.	Not connected
A4	COM1	GND	B4	A14	Address Bus
A5	N.C.	Not connected	B5	N.C.	Not connected
A6	N.C.	Not connected	B6	N.C.	Not connected
A7	N.C.	Not connected	B7	N.C.	Not connected
A8	D0	Data Bus	B8	D1	Data Bus
A9	D2		B9	D3	
A10	D4		B10	D5	
A11	D6		B11	D7	
A12	COM1	GND	B12	COM1	GND
A13	A0	Address Bus	B13	A1	Address Bus
A14	A2		B14	A3	
A15	A4		B15	A5	
A16	A6		B16	A7	
A17	A8		B17	A9	
A18	A10		B18	/NETCSB	Chip select
A19	N.C.	Not connected	B19	/WAITB	Wait
A20	+5V	+5V	B20	N.C.	Not connected
A21	+5V	+5V	B21	N.C.	Not connected
A22	COM1	GND	B22	COM1	GND
A23	/RDB	Read	B23	/WRB	Write
A24	/RESETB	Reset	B24	A12	Address Bus
A25	COM1	GND	B25	COM1	GND
A26	N.C.	Not connected	B26	A11	Address Bus
A27	+5V	+5V	B27	NICENB	Enable
A28	+5V	+5V	B28	/WAKEOUT	Wake up
A29	/NETINB	Interrupt	B29	A13	Address Bus
A30	COM1	GND	B30	COM1	GND

Detailed Descriptions

3. INSTALLATION

3.1 INSTALLING THE NIC FAX BOARD

| ⚠CAUTION |
| --- |
| **Do the following before installing an optional unit:** |
| **1. Print out all messages stored in the memory.** |
| **2. Print out the lists of user-programmed items and the system parameter list.** |
| **3. Turn off the main switch, and disconnect the power plug.** |

3.1.1 INSTALLATION PROCEDURE

NOTE: This unit cannot be installed at the same time as the PC fax expander.

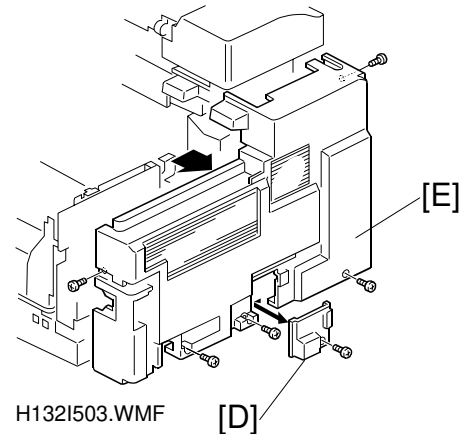1. Remove the top cover [A] (2 screws) and right cover [B] (4 screws).
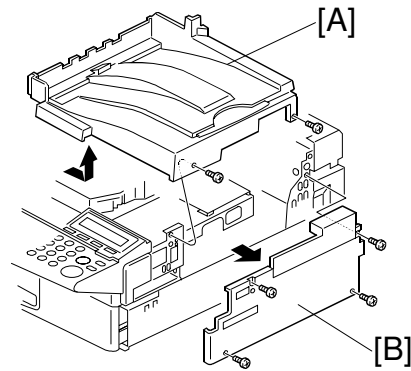
H132I501.WMF

2. Remove the operation panel [C] (2 screws) as shown.

H132I502.WMF

Installation

3-1
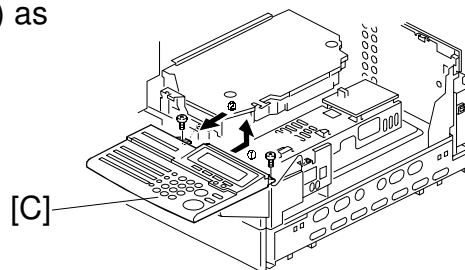
3. Remove the small cover [D] (1 screw) and the
   rear cover [E] (5 screws).

H132I503.WMF   [D]

[E]

4. Attach bracket [F] (1 screw) to the interface
   board [G] as shown.
   NOTE: Be sure to tighten the screw only
   temporarily at this moment.

[F]   [G]

H132I504.WMF
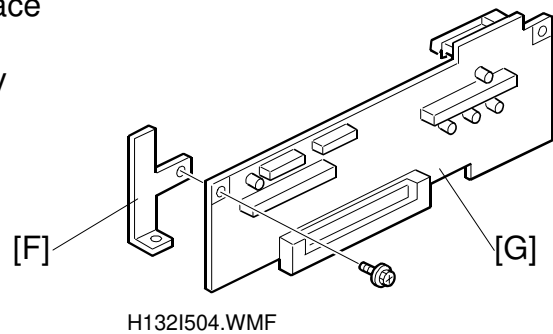
5. Attach the interface board assembly [H] to
   the machine (1 screw), then tighten all
   screws. After that, attach the bracket [I] (2
   screws) as shown.

[I]

[H]

H132I505.WMF

6. Attach the NIC board [J] (2 screws) to the interface board. Then replace the operation panel.
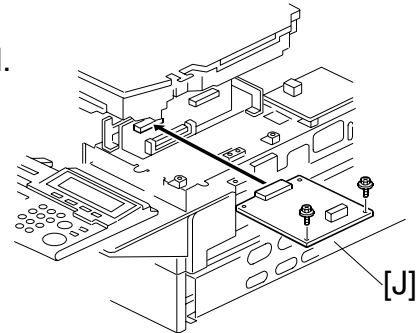
H132I506.WMF

7. First, run cable [K] though the bracket. Then attach the bracket [L] (2 screws), and three cable clamps [M] as shown.
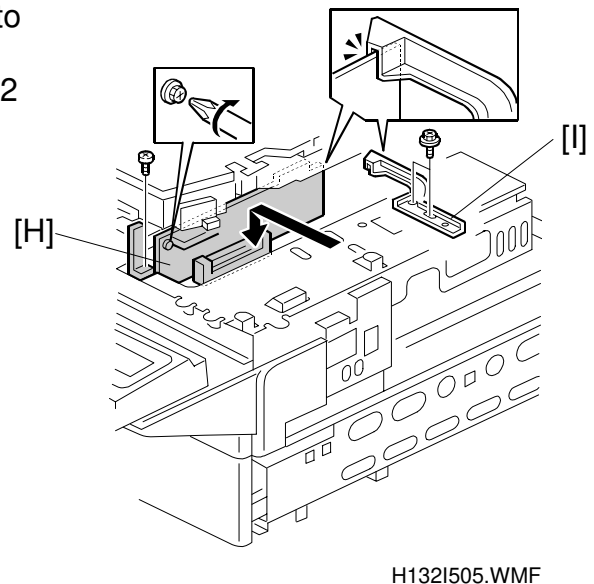   **NOTE:** Make sure the cable is not pinched between the bracket [L] and the machine.

H132I509.WMF

8. Run the cable [K] through the clamps, then connect it to the NIC board [J].
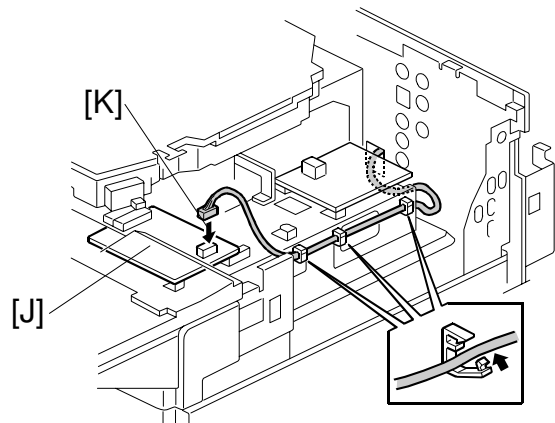
H132I510.WMF

9. Replace the top, right, and rear covers.

10. Attach the small cover [N], contained in the
    NIC fax kit interface unit, to the rear of the
    machine. Then attach the decal [O] to the
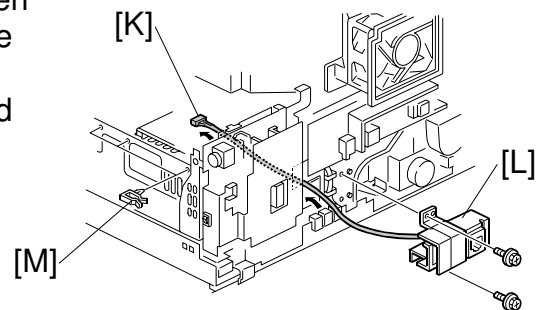   small cover [N] as shown.

[O]

[N]   H132I511.WMF
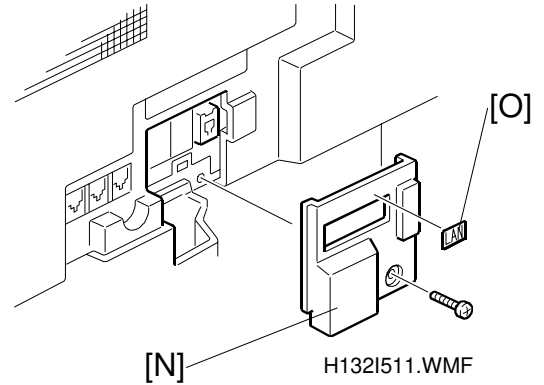
11. Attach the "NIC FAX" decal [P] to the front side
    of the top cover as shown.

[P]

H132I512.WMF
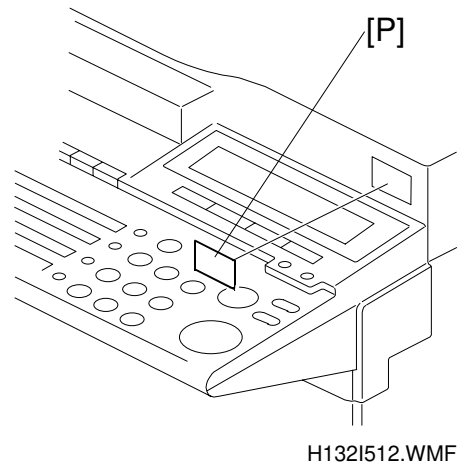
12. Plug in the machine and turn on the main
    power switch.

13. Enter the service mode and print the system parameter list. Make sure that
    "NICF" is listed as an option. Then exit the service mode.

3.2 INITIAL SETTINGS

Users can set the NIC Fax initial settings. Please refer to the Operator's Manual for NIC Fax Kit Type 500.

3.2.1 PROGRAMMING ITEMS

NOTE: NOTE: Make sure that the following items are registered in the mail server before installation.
- IP address
- Host name
- Mail account and the password

Items to Program	Programmable Functions	Remarks
IP address	User Function	
Subnet mask	User Function	
Default gateway	User Function	
DNS server address	User Function/NIC Fax Monitor	Voluntary
Access control	User Function/NIC Fax Monitor	Voluntary
Access mask	User Function/NIC Fax Monitor	Voluntary
SMTP server	User Function/NIC Fax Monitor	
POP server	User Function/NIC Fax Monitor	
Host name	User Function/NIC Fax Monitor	Voluntary
Mail address	User Function/NIC Fax Monitor	
Domain name	User Function/NIC Fax Monitor	Voluntary
Login name	User Function/NIC Fax Monitor	
Login password	User Function/NIC Fax Monitor	
E-mail acquisition interval	User Function/NIC Fax Monitor	Voluntary
Time difference	User Function/NIC Fax Monitor	Voluntary
Administrator mail address	User Function/NIC Fax Monitor	Voluntary
Backup mail address	User Function/NIC Fax Monitor	Voluntary

NOTE: When the machine is installed as a standalone fax because the mail server is not ready, program the only the following items.
- IP address: 127. 0. 0. 1
- POP Server: NULL (nothing to input)

CAUTION: The initial settings include matters related to user security, such as the login password and IP addresses. So, please ask the user to input the initial settings of the NIC Fax. If the user asks you to input the initial settings, be sure to keep the settings confidential.

3.3 INITIAL CHECK

Do the following procedures to test the machine after installation.

3.3.1 CHECKING THE LEDS

Check that the orange (LED1) and the green (LED4) LEDs light when the LAN cable is connected after the machine is turned on.
If either (or both) LEDs do not light, the following conditions may be causing a problem.

The orange LED does not light:

- The LAN board may be defective or it may not be connected to the interface board.

The green LED does not light:

- The LAN cable may not be connected to a hub.
- The LAN cable may be defective.
- The LAN board may be defective or it may not be connected to the interface board.

3.3.2 LINK CHECK

This checks the link pulse communication between the machine (LAN board) and the hub. If the link pulse is correctly received from the hub, the machine displays "OK."

1. Enter the LAN service mode.
    [User Tools] [2] [1] [9] [9] [8] then immediately
    [⟐] (Start key)
    Then press [2] [0].

```
LAN               NO:█
0.LAN SW          2.LINK CHECK
3.LOOP BACK       4.LOG DUMP
    UP      DOWN          BACK
```
H132I620.WMF

2. Press [2].

```
LINK CHECK


      PRESS "START"
                      BACK
```
H132I621.WMF

3. Press [⟐].

```
LINK CHECK


          OK!!
                      BACK
```
H132I622.WMF

If "NG" is displayed, follow the troubleshooting procedures in section 5.

3.3.3 LOOP BACK TEST

This mode checks the internal status of the LAN board.

1. Enter the LAN service mode.
   [User Tools] [2] [1] [9] [9] [8] then immediately
   ⊘ (Start key)
   Then press [2] [0].

```
LAN                NO:█
0.LAN SW           2.LINK CHECK
3.LOOP BACK        4.LOG DUMP
    UP      DOWN              BACK
```
H132I620.WMF

2. Press [3].

```
LOOP BACK

           PRESS "START"
                              BACK
```
H132I624.WMF

3. Press ⊘.

```
LOOP BACK
        RESULT CODE = 0000

                              BACK
```
H132I625.WMF

If the result shows any codes other than "0000", follow the troubleshooting procedures in section 5.

If the results of all the tests are successful, test communication with the server by sending mail from the machine back to the machine's own address.

Installation

3.3.4 PING

The PING signals are sent out to the DNS server, SMTP server, and POP server in that order. Then, the NIC fax checks the responses from the servers. If a server does not respond, a result code is displayed and the NIC fax does not send out the PING signal to the next server. When the address of a server is not registered, the NIC fax does not send out the PING signal to that server.

1. Enter the LAN service mode.
   [User Tools] [2] [1] [9] [9] [8] then immediately ◇ (Start key)
   Then press [2] [0].

```
LAN              NO:█
0.LAN SW         2.LINK CHECK
3.LOOP BACK      4.LOG DUMP
   UP     DOWN          BACK
```

H132I620.WMF

2. Press [5].

```
PING TEST

        PRESS "START"
                        BACK
```

H132I629.WMF

3. Press ◇.

```
PING TEST
      RESULT CODE = 0000
                        BACK
```

H132I630.WMF

4. SERVICE TABLES AND PROCEDURES

4.1 SERVICE LEVEL FUNCTIONS

In this section, frequently used keys are referred to with the following symbols.
⊘ - Start key
⊞ - + Key   ◀ - Left arrow key
⊟ - - Key   ▶ - Right arrow key

4.1.1 LAN BIT SWITCH PROGRAMMING

1. [User Tools] [2]
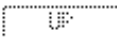
   then immediately [1] [9] [9] [8] ⊘
   within 3 seconds

```
SERVICE SET        NO.█
01BIT SW.          02PARA.LIST
03ERROR CODE       04SVC MONITOR
   UP    │  DOWN  │        END
```
H132M601.BMP

2. [2] [0]

```
LAN                NO:█
0.LAN SW           2.LINK CHECK
3.LOOP BACK        4.LOG DUMP
   UP    │  DOWN  │       BACK
```
H132M602.WMF

3. [0]
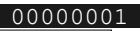
```
LAN SW
 DEFAULT : 00000001
 SWITCH00: 00000001
     −     │    +    │    BACK
```
H132M603.WMF

4. Scroll through the bit switches.
   Increment bit switch: ⊞
   Decrement bit switch: ⊟
   Example: Display bit switch 3: ⊞ x 3

```
LAN SW
 DEFAULT : 00000001
 SWITCH03: 00000001
     −     │    +    │    BACK
```
H132M604.WMF

5. Adjust the bit switch.
   Example: To change the value of bit
   7,   press [7]

```
LAN SW
 DEFAULT : 00000001
 SWITCH03: 10000001
     −     │    +    │    BACK
```
H132M605.WMF

6. Either:
   • Adjust more bit switches - go to step 4.
   • Finish - [User Tools]
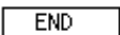
Service Tables

4.1.2 LINK CHECK

This test checks the connection from the terminal to the hub.

1. [User Tools] [2]

    then immediately [1] [9] [9] [8] [◇]
    within 3 seconds

```
SERVICE SET         NO.█
01BIT SW.           02PARA.LIST
03ERROR CODE        04SVC MONITOR
    UP      │  DOWN  │        END
```
H132M601.BMP

2. [2] [0]

```
LAN                 NO:█
0.LAN SW            2.LINK CHECK
3.LOOP BACK         4.LOG DUMP
    UP      │  DOWN  │        BACK
```
H132M602.WMF

3. [1]

```
LINK CHECK

          PRESS "START"
                         BACK
```
H132M606.WMF

4. To start a test: [◇]
    If test is successful, the display shows
    "OK!!".
    If test is unsuccessful, the display
    shows "NG!!". :
        Check the cable connection.
        Replace the cable.
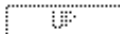
```
LINK CHECK

          NG!!
                         BACK
```
H132M607.WMF

4.1.3 LOOP BACK TEST

This test checks the connection between the FCU and the Network Interface Card (NIC).

1. [User Tools] [2]

   then immediately [1] [9] [9] [8] [⊘]
   within 3 seconds

```
SERVICE SET        NO.█
01BIT SW.          02PARA.LIST
03ERROR CODE       04SVC MONITOR
     UP     | DOWN  |      END
```

H132M601.BMP

2. [2] [0]

```
LAN              NO:█
0.LAN SW          2.LINK CHECK
3.LOOP BACK       4.LOG DUMP
    UP     | DOWN  |      BACK
```

H132M602.WMF

3. [2]

```
LOOP BACK

          PRESS "START"
                        BACK
```

H132M608.WMF

4. To start a test: [⊘]
   If test is successful, the display shows
   "RESULT CODE= 0000".
   If test is unsuccessful, the display
   shows "RESULT CODE= XXXX"
                 (excluding "0000").
     Reinstall the NIC.
     Replace the NIC or FCU.

```
LOOP BACK
          NOW CHECKING

                        BACK
```

H132M609.WMF

4.1.4 LOG DUMP

The communication between the NIC fax and the server log list is printed out.

1. [User Tools] [2]

   then immediately [1] [9] [9] [8] [⊘]
   within 3 seconds

```
SERVICE SET        NO.█
01BIT SW.          02PARA.LIST
03ERROR CODE       04SVC MONITOR
     UP     | DOWN  |      END
```

H132M601.BMP

Service Tables

2. ② ⓪

```
LAN              NO:▮
0.LAN SW         2.LINK CHECK
3.LOOP BACK      4.LOG DUMP
   UP      DOWN           BACK
```

H132M602.WMF

3. Press ④.

```
LOG DUMP

         PRESS "START"
                       BACK
```

4. Press ◈.

H132I626.WMF

4.1.5 PING

This test checks the connections to the servers.

1. [User Tools] ②
   then immediately ① ⑨ ⑨ ⑧ ◈
   within 3 seconds

```
SERVICE SET      NO.▮
01BIT SW.        02PARA.LIST
03ERROR CODE     04SVC MONITOR
   UP      DOWN            END
```

H132M601.BMP

2. ② ⓪

```
LAN              NO:▮
0.LAN SW         2.LINK CHECK
3.LOOP BACK      4.LOG DUMP
   UP      DOWN           BACK
```

H132M602.WMF

3. Press ⑤.

```
PING TEST

         PRESS "START"
                       BACK
```

H132I629.WMF

4. Press ◈.
   If test is successful, the display shows
   "RESULT CODE= 0000".
   If test is unsuccessful, the display
   shows "RESULT CODE= XXXX"
           (excluding "0000").
     Check the server settings.

```
PING TEST
       RESULT CODE = 0000

                       BACK
```

H132I630.WMF

4.2 LAN SWITCHES

⚠️**WARNING**
Do not adjust a LAN switch that is described as "Not used," as this may cause the machine to malfunction or to operate in a manner that is not accepted by local regulations. Such bits are for use only in other areas, such as Japan.

NOTE: Default settings for bit switches are not listed in this manual. Refer to the System Parameter List print out.

LAN Switch 00	Protocol	
No	**FUNCTION**	**COMMENTS**
0	LAN protocol dump list **0:** Disabled **1:** Enabled	The LAN commands between the NIC fax and servers or client PCs (POP, SMTP, and AT) are stored in the memory, and they can be printed out using service function 20-4 (LAN - log dump).
1-6	Not used	Do not change these settings.
7	SNMP protocol **0:** Enabled **1:** Disabled	SNMP (Simple Network Management Protocol) is used by network status monitoring utilities.

Service Tables

LAN Switch 01	E-mail Transmission	
No	**FUNCTION**	**COMMENTS**
0	Not used	Do not change these settings.
1	Compression modes for TIFF-F **0:** TIFF-F(MH) standard mode **1:** T.4-MH mode	RTC is added to the end of the image data when bit 1 is set to "1". A few non-standard models may require this bit to be at 1 for successful communication.
2	Inclusion on the Journal of the number of e-mail addresses in a broadcast **0:** Disabled **1:** Enabled	This bit is effective only when user parameter switch 06, bit 0 is set to "1".
3-4	Not used	Do not change these settings.

5-7	Maximum number of broadcast destinations
	Bit 7 6 5 Setting
	  0 0 0 250
	  0 0 1 150
	  0 1 0 100
	  0 1 1 50
	  1 0 0 30
	  1 0 1 10
	  1 1 0 5
	  1 1 1 0 (Disabled)
		The maximum number of broadcast destinations also depends on the SMTP server.

LAN Switch 02   E-mail Reception

No	FUNCTION	COMMENTS
0	Text e-mail header **0:** Disabled **1:** Printed	The header appears as follows: ************** E-mail INFORMATION ************* From: xxxxx Subject: xxxxxxxxxxx **
1	Action when printing a fax image file attached to an error report e-mail **0:** Print the first page only **1:** Print all pages	Note that the text part of the error report e-mail is always printed out completely, regardless of the setting of this bit.
2-7	Not used	Do not change these settings.

LAN Switch 03   Transfer Request

No	FUNCTION	COMMENTS
0	Printout of the message when the machine is acting as a transfer station **0:** Disabled **1:** Enabled	**1:** After broadcasting, the machine prints out the file.
1	Transfer result report transmission **0:** Always transmitted **1:** Only transmitted if an error occurs	**1:** The machine will only send back a Transfer result report if there were errors during communication.
2	Action taken if there is a syntax error in one or more of the destination addresses **0:** Transfers to correct destinations **1:** All destinations aborted	**1:** When a programmed end receiver destination is not a valid e-mail address or otherwise incorrect, the machine does not transfer to any destinations.
3	Polling ID required for transfer **0:** Polling ID required **1:** Polling ID not required	**0:** If the polling ID does not match the other terminal's, the machine will not execute the transfer. **1:** The machine does not check the polling ID.
4-7	Not used	Do not change these settings.

LAN Switch 04 Autorouting and Forwarding		
No	**FUNCTION**	**COMMENTS**
0-2	Not used	Do not change the settings.
3	Which RTI/CSI is passed on to the receiving PC in the e-mail subject during autorouting and forwarding **0:** Received in the e-mail from the sender **1:** Stored in the receiving machine	This determines which RTI/CSI appears in the subject of the received e-mail at the destination PC.
4-7	Not used	Do not change these settings.

LAN Switch 05 Utility Software		
No	**FUNCTION**	**COMMENTS**
0	Programmed data editing and deleting by utility software **0:** Disabled **1:** Enabled	If this bit is changed, the machine must be turned off and on to make the new setting effective. **0:** The PC utilities cannot be used to change the programmed data **1:** Programmed data can be changed, but only in administrator mode in the NIC fax software.
1-7	Not used	Do not change these settings.

LAN Switch 06 LAN Fax Transmission		
No	**FUNCTION**	**COMMENTS**
0	CSI transmission (LAN Fax) **0:** Programmed CSI **1:** Dial ATD number	**1:** The machine uses the 'own telephone number' programmed in the PC fax application. 'ATD' is an AT command. The fax application on the PC sends AT commands to NIC fax for faxing. "ATD" is used for sending the dial number.
1	Treatment of files if there is a printer error (PC printing) **0:** Store the file in the in SAF **1:** Send an error/busy signal to the PC	**0:** If a printer error/busy condition occurs, the machine stores the data in SAF. After recovery, the machine prints the data.
2	Treatment of files with errors (LAN Fax) **0:** Send the good data (before the errors) **1:** Delete the file	An error during PC fax communication indicates a SAF memory overflow or PC-fax disconnection during communication.

Service Tables

LAN Switch 06 LAN Fax Transmission		
No	**FUNCTION**	**COMMENTS**
3	Treatment of files with errors (PC printing) **0:** Print the file without the error pages **1:** Delete the file	An error during PC fax printing indicates a SAF memory overflow or PC-fax disconnection during printing.
4	Batch transmission **0:** Disabled **1:** Enabled	**1:** User parameter switch 06 bit 0 must also be enabled to perform this function
5-7	Not used	Do not change these settings.

LAN Switch 07		
No	**FUNCTION**	**COMMENTS**
0-1	Attached file width (Tx) **Bit 1 0 Setting** 0 0 A3, B4, A4, LT, DLT 0 1 B4, A4, LT 1 0 A4, LT 1 1 Not used	If the document is larger than this setting, the machine automatically reduces it.
2-3	Transmission attached file resolution **Bit 1 0 Setting** 0 0 400 x 400, 200 x 400, 200 x 200, 200 x 100 0 1 200 x 200, 200 x 100 1 0 200 x 200 1 1 Not used	If the user selects a higher resolution than enabled with this setting, the machine automatically converts the file to the highest resolution that is currently enabled.
4-7	Not used	Do not change these settings.

LAN Switch 08		
No	**FUNCTION**	**COMMENTS**
0-7	Amount of remaining memory below which e-mail reception from the server is disabled	00 to FF (Hex), unit 2 kbytes (e.g., 0C (H) = 24 kbytes)

LAN Switch 09		
No	**FUNCTION**	**COMMENTS**
0-7	Amount of remaining memory below which LAN fax communication is disabled	00 to FF (Hex), unit 2 kbytes (e.g., 0C (H) = 24 kbytes)

LAN Switch 0A		
No	**FUNCTION**	**COMMENTS**

LAN Switch 0A		
No	**FUNCTION**	**COMMENTS**
0-3	Minimum interval between accessing the server for sending	01 to 0F (Hex), unit 2 s This is the minimum interval between transmissions.
4-7	E-mail transmission: Maximum number of sending attempts to the same destination	01 ~ 0F(Hex) times Interval between accessing server attempts while re-sending.

LAN Switch 0B		
No	**FUNCTION**	**COMMENTS**
0	Acceptance of 8-bit text data (e-mail) without generating an error report **0:** Enabled **1:** Disabled	**0:** Japanese text is 8-bit. If this is received by a non-Japanese system, it will appear as garbage, but no error will be generated. **1:** When the machine receives 8-bit text data, it rejects the data and replies with an error e-mail notification.
1	Command time out for LAN fax transmission **0:** 30 seconds **1:** 60 seconds	If the data end AT command is not received from the PC application within this duration, the machine times out.
2	LAST command sending to the POP server **0:** Enabled **1:** Disabled	The LAST command is sent to the POP server by the machine during POP procedures. The reply from the server informs the machine which e-mail to start receiving from. If POP server responds abnormally, set the bit to 0: The machine will receive the most recent e-mail first. 1. The machine will always receive from the first e-mail on the list in the server. This will be necessary if the POP server still contains old e-mail that cannot be deleted.
3	Deciphering of e-mail described as Quoted-Printable **0:** One-byte codes **1:** Two-byte codes	This bit is only effective if the encoding type is Quoted-Printable. When this bit is set to 0, the e-mail is deciphered as one-byte codes (suitable for some European non-ASCII characters). When this bit is set to 1, it is deciphered as Shift-JIS code (for Japanese text). If Japanese text is received with this bit at 0, it will be deciphered as one-byte code and will appear to be a string of non-ASCII European characters.

Service
Tables

LAN Switch 0B		
No	**FUNCTION**	**COMMENTS**
4	When receiving mail with an unsupported type of header from the POP server **0:** An error notice mail will be sent back to the server **1:** Only the mail header will be printed (no error)	When the NIC fax receives an unsupported document type, it sends an error notice mail back to the POP server. If the mail does not have the correct 'from address', the server sends an error mail back to the NIC fax again. Then, if the error mail has an unsupported header type, the NIC fax will: 0: Send another error notice mail to the server 1: Print the mail header only
5-7	Not used	Do not change these settings.

LAN Switch 0C - Not used (Do not change the factory settings.)
LAN Switch 0D - Not used (Do not change the factory settings.)
LAN Switch 0E - Not used (Do not change the factory settings.)
LAN Switch 0F - Not used (Do not change the factory settings.)

4.3 SERVICE RAM ADDRESSES

┌───┐
│ ⚠CAUTION   │
│ **Do not change settings which are marked as "Not used" or "Read only."** │
└───┘

4800A0 to 4800AF (H) - LAN Switches

4802A0 to 4802A2 (H) - E-mail Tx counter

Address	High	Low
4802A0	Tens digit	Unit digit
4802A1	Thousands digit	Hundreds digit
4802A2	Hundred thousands digit	Ten thousands digit

NOTE: The following counters have the same data format as above.

4802A4 to 4802A6 (H) - E-mail Rx counter

4802A8 to 4802AA (H) - LAN fax counter

480468 to 480487 (H) - Password for administrator mode (max. 32 characters - ASCII)

NOTE: If the number of characters is less than the maximum, add a stop code (00 (H)) after the last character.

48048C to 48048F (H) - IP address

e.g. 133.139.24.3

48048C (H)	1st address: 133	85 (H)
48048D (H)	2nd address: 139	8B (H)
48048E (H)	3rd address: 24	18 (H)
48048F (H)	4th address: 3	03 (H)

NOTE: The following IP addresses have the same data format as above.

480490 to 480493 (H) - Subnet mask information

480498 to 48049B (H) - Default gateway address

48049C to 48049F (H) - Restriction on LAN fax communication (Access control)

4804A0 to 4804A3 (H) - Restriction on LAN fax communication (Access mask)

4804A4 to 4804A7 (H) – DNS server address

4804A8 to 480527 (H) - SMTP server IP address (max. 128 characters – ASCII)

480528 to 4805A7 (H) - POP server IP address (max. 128 characters – ASCII)

4805A8 to 4805E7 (H) - Host name (max. 64 characters - ASCII)

4805E8 to 480628 (H) - Own domain name (max. 64 characters - ASCII)

480628 to 480647 (H) - POP server login name (max. 32 characters - ASCII)

480648 to 480667 (H) - POP server password (max. 32 characters - ASCII)

480668 to 4806E7 (H) - Own e-mail address (max. 128 characters - ASCII)

4806E8 to 480767 (H) - Administrator's e-mail address
(max. 128 characters - ASCII)

480768 to 4807E7 (H) - Back up e-mail address (max. 128 characters - ASCII)

4807E8 to 4807EB (H) - Interval between automatic login to the POP server to
receive incoming mail (min. 0A [H] = 10 s)

e.g. 60 min. = 3,600 sec. = 0E10 (H) seconds

4807E8 (H)	00 (H)
4807E9 (H)	00 (H)
4807EA (H)	0E (H)
4807EB (H)	10 (H)

4807F4 to 4807F7 (H) – Retry interval between login to the POP server when an
error occurs (min. 0A [H] = 10 s)

4807F8 to 48080B (H) - CSI during LAN Fax Transmission
(max. 20 characters - ASCII)

**48080C to 480813 (H) - DIS information during LAN Fax Transmission
(Read only)**
The format is as follows:

48080C: Resolution	0: 200 x 100 dpi	1: 200 x 200 dpi	
48080D: Modem rate	0: 2.4 kbps	1: 4.8 kbps	2: 7.2 kbps
	3: 9.6 kbps	4: 12.0 kbps	5: 14.4 kbps
48080E: Document width	0: A4	1: B4	
48080F: Document length	0: A4	1: B4	2: No limit
480810: Compression	0: MH **(Do not change these settings.)**		
480811: ECM	0: Disable **(Do not change these settings.)**		
480812: BFT	0: Disable **(Do not change these settings.)**		
480813: I/O rate (200 x 100 dpi/200 x 200 dpi)			
	0: 0/0 ms.	1: 5/5 ms.	2: 10/5 ms.
	3: 10/10 ms.	4: 20/10 ms.	5: 20/20 ms.
	6: 40/20 ms.	7: 40/40 ms.	

4808CC to 4808CD (H) - Difference from Greenwich Mean Time
4808CC: Low - Hex
4808CD: High - Hex

Examples

USA: -5 hours = -300 min. x -1 = 300 = 012C (H)
4808CC: 2C
4808CD: 01

Japan: +9 hours = 540 min. x -1 = -540 = FDE4 (H)
4808CC: E4
4808CD: FD

A2340B to A25454 (H) – Buffer in RAM for service mode log dump

5. TROUBLESHOOTING

5.1 ERROR CODES FOR LAN COMMUNICATION

If an error code occurs, retry the communication. If the same problem occurs, try to solve the problem as suggested below.

NOTE: The errors which are marked with a "*" in the column to the left of the error code will appear with "NETWORK ERROR (ERROR CODE)" on the LCD.

	Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
	10-00	The NIC is reset because of a timeout during handshaking.	No response is received during handshaking between NIC and FCU after a certain interval, so the NIC is reset.	FCU software procedure error or abnormal e-mail data.	
	10-01	The user pressed the Stop key.	Processing is interrupted because the user pressed Stop.		
	10-02	Transmission test failed during the LAN testing procedures.	Transmission error occurred during the loop-back test.	The NIC board may be defective.	
	10-03	Reception test failed during the LAN testing procedures.	Reception error occurred during the loop-back test.	The NIC board may be defective.	
	10-04	The NIC is not ready.	The NIC is not ready after reset. The orange LED on the NIC board does not light.	The NIC board and/or ROM on the NIC board may not be connected completely. Re-install them. If that doesn't work, replace the NIC board.	FCU
	10-05	The NIC was reset because of a request from the NIC.	When an abnormal procedure occurs, the NIC sends a reset request to the FCU, then the FCU commands the NIC to reset.	NIC and/or FCU software may be working incorrectly.	
	10-06	An abnormal command caused the NIC to reset.	The NIC was reset as a failsafe, because the hand-shaking between the NIC and the FCU was incorrect.	FCU software may be working incorrectly.	
	10-07	Transmission was interrupted because the NIC was reset during tx data formatting.	The NIC was reset during the scanning of an original.	The NIC was reset by an error occurring in a job elsewhere.	

Trouble-shooting

5-1

	Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
	10-10	A file with an unsupported format was received.	A decoding error during reception. The machine checks only the descriptions in the header of the e-mail, not the actual data in the e-mail.	The received file was not compressed using DCX or TIFF-F.	
	10-11	DCX encoding error	An encoding error occurred while the scanned file was being converted using DCX during transmission.	FCU hardware may be defective and/or FCU software may be working incorrectly.	
	10-12	DCX decoding error	The received e-mail had a correct header, but an error occurred while the DCX file was being decoded.	Incorrect DCX data and/or FCU may be defective and/or FCU software may be working incorrectly.	
	10-13	TIFF-F encoding error	An encoding error occurred while the scanned file was being converted using TIFF-F during transmission.	FCU hardware may be defective and/or FCU software may be working incorrectly.	
	10-14	TIFF-F decoding error	The received e-mail had a correct header, but an error occurred while the TIFF-F file was being decoded.	Incorrect TIFF-F data and/or FCU may be defective and/or FCU software may be working incorrectly.	FCU
	10-15	E-mail reception was interrupted because the machine could not store the return address.	The machine cannot create a temporary file to store the "from address", because the maximum number of temporary files have been already created.	The e-mail will be received again after a regular interval when there are fewer temporary files. If some temporary files are deleted manually, it will be possible to create new ones.	
	10-16	The machine interrupted data reception from a PC during LAN fax transmission, because the address of the destination could not be stored.	The machine cannot create a temporary file to store the "from address", because the maximum number of temporary files have been already created.	The PC will receive a busy signal and the PC fax application will send the data again. If some temporary files are deleted manually, it will be possible to create new ones.	
	10-17	Document size and resolution of the received e-mail was over the limit.	Document size and resolution of the received e-mail was over the limit.	Document size and resolution of the received e-mail was over the limit.	

	Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
	10-20	The machine rejected an incoming e-mail for autorouting, because the ID code in the incoming e-mail did not match a personal code registered in the machine.	Incorrect ID code.	Ask the sender to correct the ID code, or change the setting of LAN bit switch 04 bit 0.	
	10-21	The machine rejected an incoming e-mail for autorouting, because an incorrect address was registered with the personal code.	Incorrect address	Correct the address, or change the setting of LAN bit switch 04 bit 2.	
	10-22	The machine rejected an incoming e-mail for transfer request, because the ID code in the incoming e-mail did not match the ID code registered in the machine.	Incorrect ID code.	Ask the sender to correct the ID code, or change the setting of LAN bit switch 03 bit 3.	FCU
	10-23	The machine rejected an incoming e-mail for transfer request, because it specified a Quick/Speed Dial that contains an incorrect address.	Incorrectly formatted address stored in the Quick/Speed Dials.	Correct the addresses stored in the Quick Dials, or change setting of LAN bit switch 03 bit 2.	
*	10-30	NIC EPROM error	Checksum error.	The EPROM on the NIC board may be defective. Replace the NIC board and/or EPROM if this error keeps appearing.	
*	10-31	NIC memory error	The result of the checked memory value was incorrect	The DRAM on the NIC board may be defective. Replace the NIC board if the error keeps appearing.	NIC
*	10-32	NIC serial module error	The hardware for the serial module in the CPU on the NIC board may be defective.	Replace the NIC board if the error keeps appearing.	
*	10-33	NIC timer module error	The hardware for the timer module in the CPU on the NIC board may be defective.	Replace the NIC board if the error keeps appearing.	

Trouble-shooting

	Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
*	10-34	Error on the interrupt line connecting NIC to FCU	The hardware for the interrupt line between the NIC board and the FCU may be defective.	Replace the NIC board if the error keeps appearing.	
*	10-35	Network controller error	Network controller hardware error on the NIC board	Replace the NIC board if the error keeps appearing.	
*	10-40	IP address not stored in the machine	The machine checks if the IP address is stored when the NIC board is reset.	Store the IP address of the machine.	
*	10-41	IP address conflict	The machine's IP address conflicts with another machine's. The machine check for IP address conflict using ARP procedures when the machine is turned on.	Change the IP address.	
	10-42	Abnormal TCP/IP socket procedure	Error during the internal checking procedure of the NIC software runs when the machine is turned on	The NIC board and/or NIC ROM may be defective, or the NIC software is working incorrectly.	
	10-43	Timeout during hand shaking	Error while the machine checks the handshaking between NIC board and FCU when the machine is turned on	The NIC board and/or NIC ROM may be defective, or the NIC software is working incorrectly.	NIC
	10-44	Sequence error during handshaking	Error while the machine checks the handshaking between NIC board and FCU when the machine is turned on	The NIC board and/or NIC ROM may be defective, or the NIC software is working incorrectly.	
*	10-45	IP address for DNS server not stored in the machine	DNS IP address is not registered	Check that the DNS IP address is correct.	
*	10-46	DNS server cannot be found	Cannot find the DNS server.	Check that the DNS IP address is correct.	
	10-50	Connection with the PC through a LAN was interrupted while receiving data from the PC (LAN fax transmission).	The PC was turned off or there was too much traffic on the LAN.	Check the power switch of the PC and reduce the traffic on the LAN.	
	10-51	AT command sequence error during LAN fax transmission.	An AT command sequence error occurred during data reception from the PC fax software. The NIC received unexpected AT commands or no AT command.	Unsupported PC fax software or the NIC board may be defective. Use supported PC fax software or change the NIC board.	

	Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
	10-52	Unsupported AT commands were received.	The NIC received unsupported AT commands from the PC fax software.	Unsupported PC fax software or the NIC board may be defective. Use supported PC fax software or change the NIC board.	
	10-53	Command time-out occurred while receiving data from PC fax software.	The NIC did not receive AT commands from the PC at the correct time.	The PC fax software does not work correctly. Delete the software and reinstall it if the error keeps appearing. Otherwise, COM Redirector does not work correctly. Delete and reinstall COM Redirector if the error keeps appearing.	
	10-54	Command for interrupted request was received	The user interrupted PC fax software procedures during LAN fax transmission.	Caused by the user	
*	10-60	POP server IP address not registered	The IP address of the POP server is not registered in the machine.	Register the IP address.	
*	10-61	POP server cannot be found	The machine cannot find the POP server on the LAN.	Make sure that the IP address of the POP server is correct and check the traffic on the LAN.	NIC
*	10-62	Logging into POP server is disabled.	The machine finds POP server, but logging in is disabled.	Delete the user name and password of the POP server in the machine, then input it again. Otherwise, call administrator of the POP server.	
*	10-63	Disconnection from POP server.	The machine received a message from POP server that it will disconnect the communication.	Check the traffic on the LAN. Otherwise, call the administrator of the POP server to check if the server is turned off.	
	10-64	MIME decoding error	Error during MIME decoding on the NIC board during reception.	Abnormal MIME data. Replace the NIC board if the error occurs during reception from several senders.	
	10-65	E-mail with unsupported type of header was received	The machine decides whether the e-mail is a supported type or an unsupported type by the header of the e-mail.	The machine received an e-mail with a header type other than "text/plain" and "base 64".	

Trouble-shooting

	Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
	10-66	Received e-mail format error	This is indicated the received e-mail is not standard. There is no boundary between parts of the e-mail.	Sender must send e-mail under regulation.	
	10-67	The machine did not receive a response from the POP server at the expected time.	The POP procedures were interrupted by the server during reception.	The POP server is not working properly. Call the administrator of the server.	
*	10-70	No IP address stored for the SMTP server	The IP address of the SMTP server is not registered in the machine.	Enter the IP address in the machine.	
*	10-73	SMTP server cannot be found	The machine cannot find the SMTP server on the LAN.	Check the IP address of the SMTP server and check the traffic on the LAN.	
*	10-74	No e-mail address is stored.	The e-mail address of the machine is not stored in the machine.	Enter the e-mail address in the machine.	
	10-75	The e-mail address is too long.	The length can be up to 127 bytes.	Delete the address and enter it again.	
	10-76	No destination address was entered for transmission.	A temporary file is created to store the destination address for transmission. The machine checked the size of the file and the result was zero bytes.	Enter the address again.	NIC
	10-77	Incorrect destination address	The destination address does not exist in the server. The server determines whether the account of the destination is inside or outside the server by the domain name of the e-mail address. The server informs the machine during the POP procedures when there is no account in the server even though the domain name indicates the account should be on the server. When it is clear that the account is not on the server because of the domain name, the server has no way to know if the address is correct.	Enter the address again.	

	Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
	10-78	Too many destinations	The server informs the machine during SMTP procedures when the number of destinations in a broadcast is over the limit of the server.	Divide the broadcast into two or more operations. Use LAN switch 01 to change the maximum number of broadcast destinations to match the server's limits.	
	10-79	SMTP server hard disk full	The SMTP server informs the machine during the SMTP procedures that the server hard disk is full.	Call the administrator of the server.	
	10-80	SMTP server shutdown	The SMTP server tells the machine during the SMTP procedures that it is shut down during communication.	Call the administrator of the server.	
	10-81	SMTP server busy	The SMTP server informs the machine during the SMTP procedures that it cannot handle the data because of a problem, such as a locked mail spooler.	Call the administrator of the server.	
*	10-82	SMTP server turned off	When the server is turned off, the machine is informed by TCP/IP procedures that connection between the machine and the server is interrupted.	Check whether the LAN is congested or if a cable has been disconnected, or call the administrator of the server.	NIC
	10-83	Report format error	One line in the text data was too long when the machine created text e-mail for an error report.	Abnormal software procedure	
	10-84	The machine did not receive a response from the SMTP server at the correct time	The machine sent commands to the SMTP server during transmission, but the server did not answer at the correct time	Abnormal SMTP server procedures. Check whether the LAN is congested or whether a cable has been disconnected, or call the administrator of the server.	
	10-85	Unexpected response from the SMTP server.	The SMTP server sent a response to machine which had an unexpected value.	Abnormal SMTP server procedures. Check whether the LAN is congested or whether a cable has been disconnected, or call the administrator of the server.	

Trouble-shooting

	Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
	10-86	Failure of memory assignment for SMTP	There is not enough memory in NIC.	Turn the power off and on of the machine. If this error occurs again, change the NIC board.	NIC
	10-90	No encoded line in the e-mail during transmission.	An error occurred while encoding scanned data.	The FCU software is not working properly.	FCU
	10-91	Number of encoded lines does not match the number of scanned lines in the transmission.	An error occurred while encoding scanned data.	The FCU software is not working properly.	
	10-92	Value of encoded off-set does not match the scanned lines in the transmission.	An error occurred while encoding scanned data.	The FCU software is not working properly.	
	10-93	Non-standard data in the e-mail.	The received e-mail contains non-standard image data.	Abnormal e-mail data. Inform this to the sender.	
	11-00	Error when writing program to the Flash ROM.	An error occurred while writing the NIC firmware to the Flash ROM.	The Flash ROM on the NIC is defective. Change the NIC board.	NIC
	11-01	Error in the transfer data header information	An error occurred while writing the NIC firmware to the Flash ROM.	The Flash card is defective.	
	11-02	Transfer data check sum error	An error occurred while writing the NIC firmware to the Flash ROM.	The Flash card is defective.	
	11-03	Abnormal transfer data length	An error occurred while writing the NIC firmware to the Flash ROM.	The Flash card is defective.	
	11-04	Error during erasing the Flash ROM.	An error occurred while writing the NIC firmware to the Flash ROM.	The Flash ROM on the NIC is defective. Change the NIC board	
	11-05	Error during writing to the Flash ROM.	An error occurred while writing the NIC firmware to the Flash ROM.	The Flash ROM on the NIC is defective. Change the NIC board	
	11-06	Check sum error while writing data.	An error occurred while writing the NIC firmware to the Flash ROM.	The Flash ROM on the NIC is defective. Change the NIC board	
	11-07	Reprogramming error	An error occurred while writing the NIC firmware to the Flash ROM.	The Flash ROM on the NIC or the Flash card is defective. Change the NIC board	
	11-90	Illegal SNMP community	Illegal SNMP community is received.	Check the network and other network devices.	
	11-91	Illegal SNMP packet	Illegal SNMP packet is received.	Check the network and other network devices.	
	11-92	Illegal SNMP packet size	An SNMP packet larger than 1024 bytes is received.	Check the network and other network devices.	

Code	Meaning	Explanation	Suggested Cause/Action	Error is informed from
11-93	Illegal SNMP OID size	An SNMP OID of over 24 bytes is received.	Check the network and other network devices.	NIC

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shooting

5.2   LAN TEST FUNCTION

5.2.1 LINK CHECK

A machine and a hub send and receive link pulses to each other to check the connections to the LAN at regular intervals. The machine lights the green LED on the NIC board when the pulses are received successfully.

When the link check is performed, the machine checks for a link pulse. The machine indicates "OK" on the display when the link pulse is received successfully.

Check the LEDs both on the NIC board and on the hub to see if the connection through the LAN cable is active.

• The machine watches the received link pulse from the hub in the link check test function. To check the link pulse from the machine to the hub, check the LED on the hub.

NOTE: While the machine is on, the orange LED on the NIC board is lit if it has been initialized successfully.

5.2.2 LOOP BACK

When the loop back test is performed, the FCU sends test data to the NIC board. The data is sent back to the FCU using the loop-back function of the NIC. The FCU checks if the test data is the same as the data returned from the NIC. When they are the same, the FCU indicates "RESULT = 0000' on the display, which means that the NIC board test was successful.

NOTE: The machine does not send test data out of the machine on the LAN during the loop back test. The result is indicated even if the LAN cable is not connected to the NIC board.

When the NIC board is defective, one of the error codes in the following table will appear. In this case, re-install the NIC board and/or cable, or change them if the loop back test is still not successful.

- LOOP-BACK TEST RESULT CODES -

Code	Meaning	Code	Meaning
0000	The test finished without errors.	0008	Data delay error
0001	Defective IC network controller on the NIC board	0009	Carrier loss
0002	Test data did not meet regulations.	000A	Data is not processed at the correct time
0003	Data collision error	000B	No data received
0004	Buffer overflow while receiving data	000C	Data frame error
0005	Memory error	000D	Data overflow
0006	Memory error	000E	CRC error
0007	Received data does not reach the buffer at the correct time	000F	Receiving data buffer error

5.2.3 PING

The PING signals are sent out to the DNS, SMTP, and POP servers in the order. The NIC fax checks the responses from the servers.

When the NIC fax receives all responses from the servers, it will display "RESULT CODE = 0000" (OK) on the operation panel. If a server does not respond, a result code is displayed on the operation panel and the NIC fax will not send out the PING signal to the next server. When the address of a server is not registered, the NIC fax does not send out the PING signal to that server.

The NIC fax checks the connection to the server address using the PING function. However, it only checks the connection to the specified address. If the wrong address is registered for a server and another server is connected to the network at that address, that server will respond to the PING signal, and the result of the PING test will be OK. So, the PING test alone will not guarantee successful e-mail transmission and reception if the wrong addresses are input.

However, the PING test is a good tool for checking the network connection. If an e-mail problem occurs in the field, try the PING test first.

Result Code	Server
1046	DNS
1061	POP
1073	SMTP

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5.2.4 LOG DUMP

The protocol logs for communication between the POP/SMTP server and the NIC fax unit are stored in 16-Kbyte memory in the machine. The logs can be printed out. The log dump list shows the POP/SMTP commands and the responses from the server(s).

The NIC fax sends out POP commands to the POP server automatically even if there is not any received e-mail in the POP server. Then the POP commands and responses are stored in the memory. So, if it takes a long times when an error occurs, the data from older errors will be lost.

5.3 TROUBLESHOOTING PROCEDURES

5.3.1 OVERVIEW

To resolve problems, a basic understanding of networking is required.

NIC FAX Overview
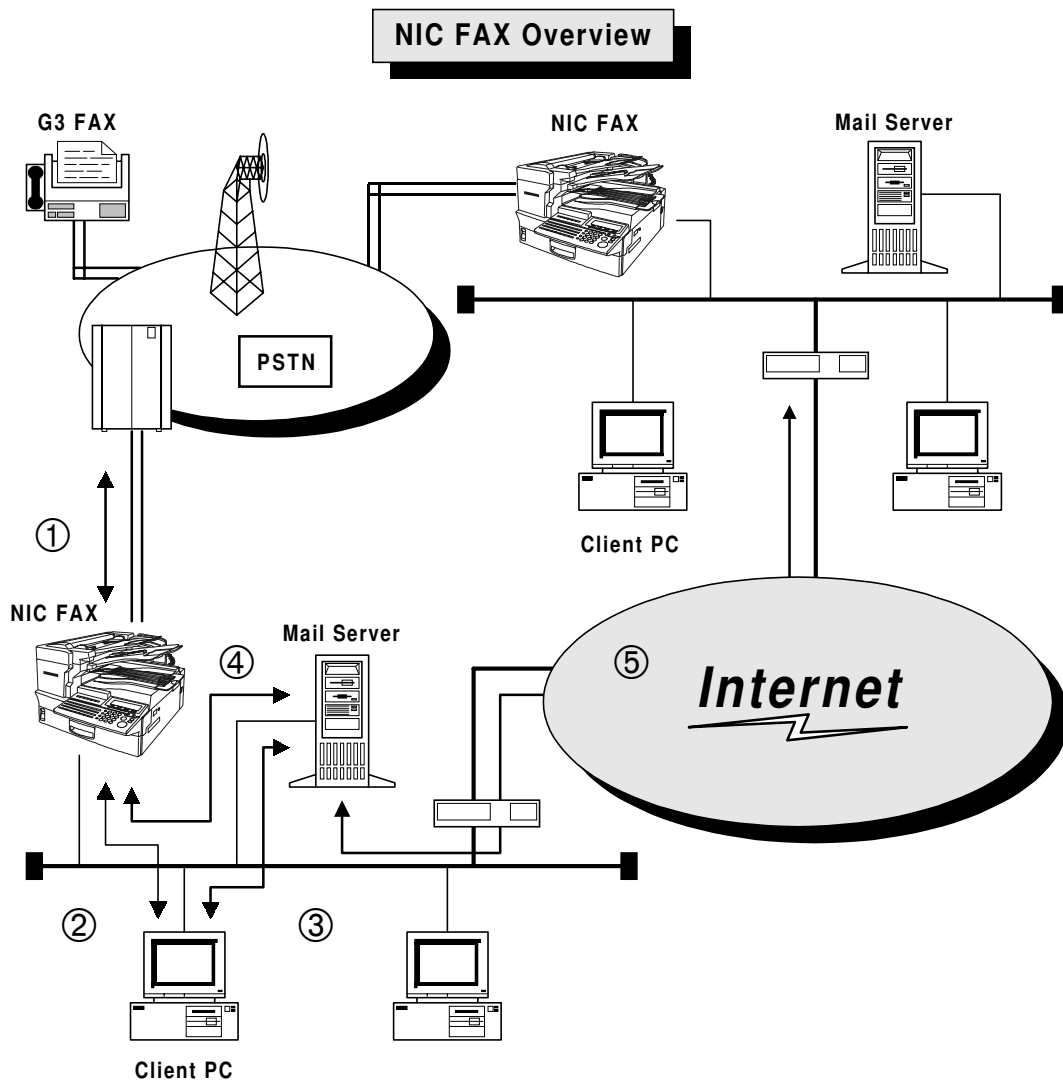
H132T600.WMF

The drawing shows the route used for the various features used by this machine.

- LAN fax tx: ②-①
- 200-dpi printer: ②
- 200-dpi scanner: ④-③
- Autorouting: ①-④-③
- Forwarding: ①-④-③

- Internet fax (paper to paper): ④-⑤
- Internet fax (paper to PC):   ④-⑤
- NIC Fax Monitor: ②
- IC Viewer: On PC only

5.3.2 TROUBLESHOOTING PROCEDURES

Use the following procedures to determine whether the machine or another part of the network is causing the problem.

Communication Route	Item	Action	Remarks
General LAN	1. Connection with the LAN	• Check that the LAN cable is connected to the machine. • Check that the LEDs on the NIC board and the hub are lit.	
	2. LAN activity	• Check that other devices connected to the LAN can communicate through the LAN.	
① G3 communication	Refer to G3 fax troubleshooting		
② Between NIC Fax and PC	1. Com Redirector	• Check the modem settings in Windows 95 • Check the port setting in Windows 95 • Make sure that the IP address registered in the machine is the same as the address stored in Com Redirector. • Is the target NIC fax running?	• Is the modem set up in Windows 95 control panel set up the same way as described in the operation manual? • Are the printer properties in Windows 95 control panel created by the fax application software set up as in the operation manual?
	2. Application fax software	• Check the transmission port setting. • Check whether a PSTN access number is required.	• Refer to the operation manual for the application.
	3. Network settings on the PC	• Check the Windows 95 network settings on the PC.	• Is the IP address registered in the TCP/IP properties in the Windows 95 network setup correct? Check the IP address with the administrator of the network.
	4. Check that PC can connect with the machine	• Use the "ping" command on the PC to contact the machine.	• At the MS-DOS prompt, type ping then the IP address of the machine, then press Enter.
	5. LAN settings in the machine	• Check the LAN parameters • Check if there is an IP address conflict with other PCs.	• Use "LAN parameters" in service function 20. • If there is an IP address conflict, inform the administrator.

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Communication Route	Item	Action	Remarks
③ Between PC and e-mail server	1. E-mail application software	• Use the application to check if transmission and reception are possible with destinations other than the NIC fax machine. • When an error message appears in the application, solve it first.	• Inform the LAN administrator of the problem so that it can be dealt with.
	2. Network settings on the PC	• Check the PC's Windows 95network settings.	• Is the IP address registered in the TCP/IP properties in the Windows 95 network setup correct? Check the IP address with the administrator of the network.
	3. E-mail account on the server	• Make sure that the PC can log into the e-mail server. • Check that the account and password stored in the server are the same as in the machine.	• Ask the administrator to check.
	4. E-mail server	• Make sure that the client devices which have an account in the server can send/receive e-mail.	• Ask administrator to check. • Send test e-mail with the machine's own number as the destination. The machine receives returned e-mail when the communication is performed successfully.
④ Between machine and e-mail server	1. LAN settings in the machine	• Check the LAN parameters • Check if there is an IP address conflict with other PCs.	• Use "LAN parameters" in service function 20. • If there is an IP address conflict, inform the administrator.
	2. E-mail account on the server	• Make sure that the machine can log into the e-mail server. • Check that the account and password stored in the server are the same as in the machine.	• Ask the administrator to check.

Communication Route	Item	Action	Remarks
④ Between machine and e-mail server	3. E-mail server	• Make sure that the client devices which have an account in the server can send/receive e-mail.	• Ask the administrator to check. • Send test e-mail with the machine's own number as the destination. The machine receives returned e-mail when the communication is performed successfully.
⑤ Between e-mail server and internet	1. E-mail account on the Server	• Make sure that the PC can log into the e-mail server. • Check that the account and password stored in the server are the same as in the machine.	• Ask the administrator to check.
	2. E-mail server	• Make sure that the client devices which have an account in the server can send/receive e-mail.	• Ask the administrator to check. • Send test e-mail with the machine's own number as the destination. The machine receives returned e-mail when the communication is performed successfully.
	3. Destination e-mail address	• Make sure that the e-mail address is actually used. • Check that the e-mail address contains no incorrect characters such as spaces.	
	4. Router settings	• Use the "ping" command to contact the router. • Check that other devices connected to the router can sent data over the router.	• Ask the administrator of the server to check.
	5. Error message by e-mail from the network of the destination.	• Check whether e-mail can be sent to another address on the same network, using the application e-mail software. • Check the error e-mail message.	• Inform the administrator of the LAN.

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5.4   SYMPTOMS FOR TROUBLESHOOTING

Internet fax machines, LAN fax transmission, and the PC utilities use procedures which are not the same as the fax machines we are familiar with. The following can help solve problems in the field.

5.4.1 INTERNET FAX

Decoding error during reception (1)

- Possible Cause -
When the machine receives e-mail with attached files that are not in TIFF-F or DCX format, a decoding error occurs because the machine cannot decode the files. The error occurs even if a text file is attached.

- Explanation/Action -
ITU-T and IETF require a TIFF-F formatted file to be attached for an internet fax message. The sender should send the e-mail again, with a TIFF-F formatted file attached.

Decoding error during reception (2)

- Possible Cause -
The received e-mail has an attached file that has an unsupported resolution or page size. Messages of up to A4 width and up to 200 x 200 dpi resolution can be received.

- Explanation/Action -
ITU-T and IETF specify a maximum size of A4 width for an attached file. The sender should resend the e-mail, with an A4 size file attached. The paper size is not negotiated during Internet fax handshaking.

The machine can send e-mail even though the host name and domain name are not stored in the machine's LAN parameters

- Possible Cause -

During transmission to the SMTP server, the host name and domain name stored in the machine are used in the argument of the SMTP "HELO" command. However, the SMTP server can receive the "HELO" command without the argument, so the machine does not check whether the host name and domain name are stored.

- Explanation/Action -

At installation, the host name and the domain name are not required if they are unknown at the time. If incorrect names are stored, the SMTP server does not accept the HELO command and the machine cannot send e-mail to the SMTP server. Then, the machine fails to resend the correct number of times and prints an e-mail transmission error report.

An error occurs in the first part of the e-mail transmission procedure

- Possible Cause -

There is no domain name in the destination e-mail address (e.g., "123" is used instead of an e-mail address).

- Explanation/Action -

When an e-mail address is sent to the SMTP server without a domain name (the address is blank is after the "@" symbol), the server searches for the same user name in the local server. The server fails to find the user name then the transmission is rejected in accordance with SMTP procedures. This is done in the first part of the e-mail transmission SMTP procedure.

NOTE: The following describes what happens if the domain name of the destination is correct but the user name of the destination is incorrect.

1) When an e-mail with a domain name which is different from the local domain name is sent, the SMTP server accepts the transmission and forwards the e-mail to the next SMTP server even if the user name of the e-mail address is incorrect. The local SMTP server cannot check user names in a remote server.

2) After that, the destination SMTP server checks the user name to see if that user has an account with the server. If there is no account, the server creates an e-mail error report and sends it to the sender, and this report is printed by the machine.

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LAN parameters are not listed on the system parameter list after the NIC board is replaced

- Possible Cause -
Poor electrical contact between NIC board and machine

- Explanation/Action -
When the machine does not recognize the NIC board, the NIC board does not initialized and LAN parameters are not listed. The NIC board should be installed again.

A communication error is indicated on the operation panel because the e-mail server is down

- Possible Cause -
The machine attempts to receive e-mail from the POP server by POP procedures at a regular interval. When the machine cannot contact the server, a POP error occurs in the machine. A POP error also occurs if the LAN cable is pulled out of the machine or if the network is down.
When there is a POP error, a communication error is indicated on the display and the communication error LED is lit.

- Explanation/Action -
The machine recovers from a POP error when either the next POP procedure or the next SMTP procedure with the server is performed successfully. The user does not have to press the Stop key.

When a number of e-mail addresses separated with commas are stored for transmission, a transmission error occurs. (eg. aaa@bbb.com, ccc@ddd.com, ddd@eee.com)

- Possible Cause -
An SMTP error occurs in the above case.

- Explanation/Action -
When storing more than one e-mail address, the user must press the Yes key after storing each address.

5.4.2 NIC FAX MONITOR

The user forgot the password for going into administrator mode

- Possible Cause -
The administrator password is stored in the machine, not in the PC. The password is not reset if the user re-installs the utility. The administrator password can changed with the utility, but the current password is needed.

- Explanation/Action -
A new password can be stored as follows.

   • Use "rifmaint" as the administrator password for the utility.
   • Change the password using "rifmaint" as the current password.

"Rifmaint" is always available even after a new password is stored.

Error after the user restores backed-up data

- Possible Cause -
Data must be backed up before resetting the RAM.

- Explanation/Action -
Restore backed-up data with NIC Fax Monitor after the RAM in the machine has been reset.

NOTE: 1) The following data can be backed up in the PC.
   • Quick dials
   • Speed dials
   • Group dials
   • BOX codes
   • Address for memory forwarding
2) The following data cannot be backed up in the PC.
   • Administrator password
   • RTI/CSI/TTI
   • Own G3 telephone number
   • Polling ID
   • Bit switch settings
   • LAN parameters
   • Administrator e-mail address

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shooting**

When an administrator logs into the machine, some functions cannot be done at the operation panel and "BUSY! PC COMMUNICATING" appears on the display.

- Possible Cause -
When NIC Fax Monitor is being used in administrator mode, user tool functions cannot be used at the operation panel. This is to prevent stored data in the machine from being changed simultaneously at the PC and the fax machine.

    NOTE: If any of the above functions is being used at the machine, the administrator password cannot be used to log into the machine with NIC Fax Monitor.

- Explanation/Action -
Use the above functions after logging out of administrator mode.

5.4.3 COM REDIRECTOR

A Windows 95 error occurs when Com Redirector is reinstalled.

- Possible Cause -
When Com Redirector is uninstalled while it is still running, some files are not removed from the PC. The error occurs because the files are not overwritten during reinstallation.

- Explanation/Action -
The following are required to reinstall.

- Shut down Windows 95.
- Start Windows 95 again.
- Stop running Com Redirector and all applications.
- Uninstall Com Redirector
- Reinstall Com Redirector.

The PC cannot send a message to the machine using LAN fax transmission.

- Possible Cause -
Two PCs can send a message to the machine at once. The third PC receives a busy signal from the machine and cannot send the message. Another cause may be that the PC was rejected as a result of the stored access control/access mask.

- Explanation/Action -
The user at the third PC must resend the message after the first or second PC has finished.

The Windows 95 COM port cannot be used after Com Redirector and fax application software were both installed.

- Possible Cause -
The fax application software does not supported COM 5 or higher because the application is a 16-bit application.

- Explanation/Action -
When Com Redirector is installed, it automatically looks for an available COM port starting from COM3, then uses this port. Com Redirector offers this COM port to the fax application. When Com Redirector offers COM5 or higher, because the lower ports are already taken, a 16-bit fax application cannot use it.

Remove the application software that uses COM 3 or COM 4, then release the COM ports. Then install the 16-bit fax application again.

NOTE: 32-bit fax applications can use COM 5 or higher. Microsoft Fax, the standard Windows 95 fax application, is a 32-bit application.

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shooting

APPENDIX A

1.   LAN BASICS

1.1   LAN CONFIGURATIONS

1.1.1 OVERVIEW

A LAN (Local Area Network) links computers within an installation such as a building or factory. It consists of communications hardware such as interface boards and cables, and software for the computers that are to be connected.

1.1.2 BASIC TYPES

The following three configurations are available for linking computers. The different wiring configurations are often referred to as 'topologies

With all three topologies, signals sent from one computer go to all other computers. An address is included at the start of the data so that it is ignored by all computers except the destination.

Bus Configuration

One central cable is installed, with computers connected to it in branch fashion. All data is sent via the central cable.

Network Topology

a) Bus Connection

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Appedix A
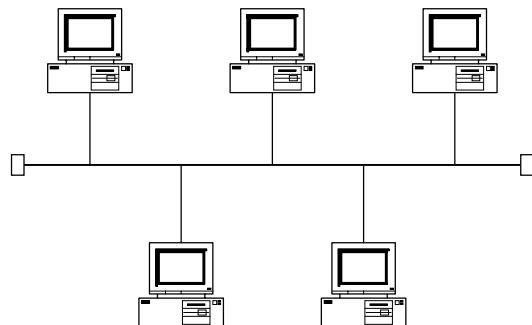
Star Configuration

A central hub is used, with computers connected around it. All data is sent from the central hub.

b) Star Connection
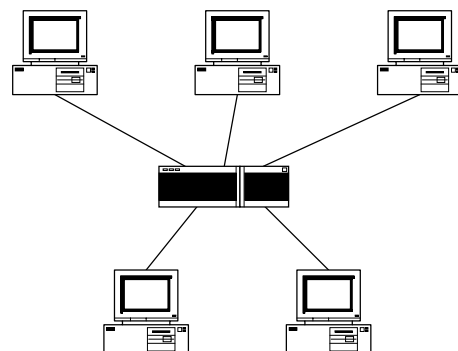
H132X502.WMF

Ring Configuration

Computers are connected in a ring.

c) Ring Connection
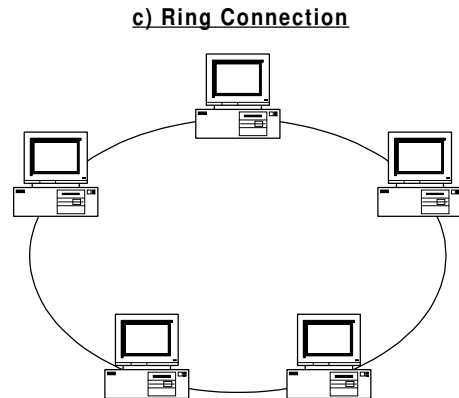
H132X503.WMF

Because the data sent by one computer reaches all the others, only one computer may send data at any one time, or there will be a collision of data on the circuit. If one computer continues sending data, it will occupy the LAN to the exclusion of all others. To prevent this problem, data is limited to a length of a few kbytes. These small units of data are referred to as 'packets' or 'frames'.

1.1.3 AVOIDING DATA COLLISION

Collisions occur when data is sent from a number of computers simultaneously. Two methods are employed to prevent this.

(a) The computers detect whether there is any data on the LAN, and only send when the LAN is free. There are several ways to do this. A typical method is CSMA/CD, which is used with Ethernet applications.

   CSMA/CD (Carrier Sensing Multiple Access/Collision Detection)
   A method by which multiple computers have access to the transmission route (referred to as 'multiple access'). The computers monitor the transmission route for data (carrier sensing), and send data if none is currently being sent. If a data collision is detected, the data is resent after a randomly determined wait time.

(b) Token passing, in which collision of data is avoided before the event. Tokens ensure that the data only goes to the intended computer.

The various connection configurations and ways of avoiding data collision have resulted in a number of different types of LANs. The different types are incompatible when directly connected to each other, thus requiring the use of relay devices.

Main LAN Types and Their Characteristics

Type		Cable connection configuration	Transmission speed	Cables	Access control (collision avoidance)	Remarks
Ethernet	10Base-5	Bus	10 Mbits/s	Thick coaxial	CSMA/CD	The original Ethernet configuration
	10Base-2	Bus	10 Mbits/s	Thin coaxial	CSMA/CD	A simplified version of 10Base-5
	10Base-T	Star	10 Mbits/s	Twisted-pair	CSMA/CD	Currently the main type in use
Token ring		Star	4 Mbits/s or 16 Mbits/s	Twisted-pair	Token passing	IBM standard LAN
FDDI		Ring and star	100 Mbits/s	Optical fiber, twisted-pair	Token appending	Used primarily for trunk lines
Local Talk		Daisy chain	230 kbits/s	Twisted-pair	Proprietary	Fitted as standard to Macintosh PCs

* The NIC fax uses 10Base-T.

1.2 ETHERNET

1.2.1 OVERVIEW

Ethernet is currently the commonly-used LAN. It was originally developed by DEC, Intel, and Xerox. The original Ethernet standard incorporated what is now known as the 10Base-5 specialized Ethernet coaxial cable.

The IEEE802.2 standard was based on the Ethernet standard. Specifications for hardware components such as cables, were revised.

IEEE802.3 was then developed for use with media other than 10Base-5. 10Base-2, 10Base-F, and the most widely used 10Base-T, were subsequently developed.

In contrast to the Ethernet standard data transfer speed of 10 Mbps, IEEE802.3 allows data transfer at speeds between 1 and 20 Mbps.

1.2.2 ETHERNET FRAME STRUCTURE

Ethernet frames consist of the addresses of the source and destination computers, an identifier for the type of protocol used, the data, and finally the FCS (which is used to check whether or not the data has been correctly sent and received).

Compare the Ethernet frame type and the IEEE802.3 frame type in the following diagram.

Ethernet frame

Data (46 ~ 1,500 octets)

Frame Type (2 octets)
Source Address (6 octets)
FCS (4 octets)
Destination Address (6 octets)

IEEE802.3 frame

LLC Frame
(Data, 46 ~ 1,500 octets)

LLC Data Length (2 octets)
Source Address (6 octets)
FCS (4 octets)
Destination Address (6 octets)

H132X551.WMF

APPENDIX A-4
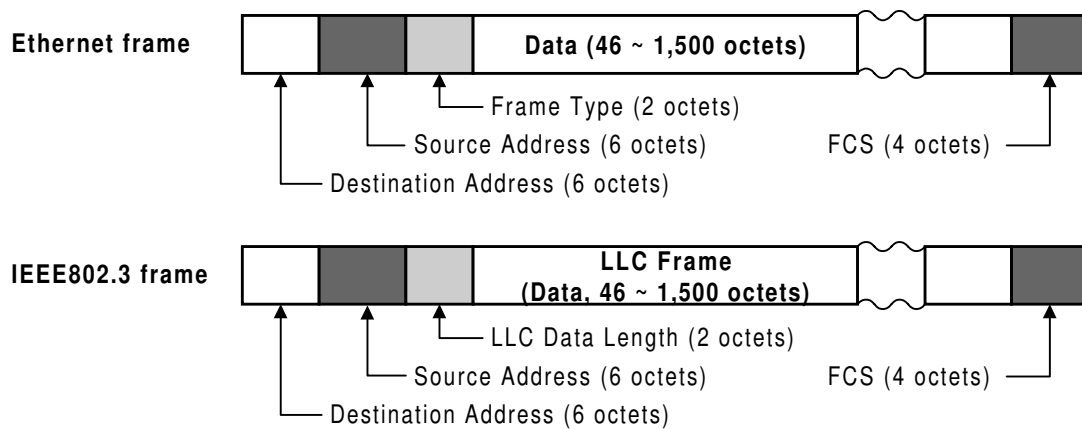
- FCS (Frame Check Sequence):
  A CRC (Cyclic Redundancy Check) is employed to check whether or not the received data is correct. The receiving device (receiving node) reconstitutes the FCS from the received data. If it does not match the sent FCS, that frame is discarded as corrupted.
- Identifier:
  Indicates the type of data that follows. The identifier is referenced by the receiving node to determine the type of protocol used to send the data.
- Octet:
  A unit employed to indicate network data size. 1 octet is 8 bits (1 byte).
  The term is used to make a clear division into 8-bit units from a continuous stream of 1s and 0s with no inherent division into bytes.
- LLC (Logical Link Control):
  The name of the data frame defined in IEEE802.3.
- Node
  A computer or printer connected to the network.

1.2.3 MAC ADDRESSES

To allow each node in the network to communicate with others, it must have a unique identifier. In the Ethernet standard, a 48-bit address known as the MAC (Media Access Control) address is assigned to each computer. Each data frame contains the MAC addresses of the source and destination computers.

The MAC address is a fixed physical address that is set on the network card. It is six bytes in length for the Ethernet standard. The first three bytes are a header code which is controlled and allocated by the IEEE, and the last three bytes are a code independently controlled with each header (to prevent duplication). This ensures that the physical address of each Ethernet card is unique.

Under the Ethernet standard, frames are sent and received using these addresses (see 'Ethernet Frame Structure').

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1.3   LAN HARDWARE

1.3.1 OVERVIEW

The basic LAN configuration consists of four hardware items.

- Interface boards - also known as LAN boards or Network Interface Cards (NICs):
  Convert digital data into electrical signals, prevent data collision, and transmit data on cables
- Cables:
  Primarily unshielded twisted-pair (UTP) and optical fiber cables
- Hubs:
  Distribute signals
- Relay devices:
  Connect LANs for the transmission of data to remote locations

LAN devices are regulated by IEEE (Institute of Electrical and Electronic Engineers) standards.

In addition to hardware, the following types of software are also needed.

- Transmission protocol software that can transmit data via a variety of relay devices
- Applications (database, e-mail), to provide the data in a format usable by the operator

1.3.2 RELAY DEVICES

Relay devices are required to expand LANs. These devices do the following.

Extending the Connection Distance

LANs allow high-speed transmission of data, achieved by sending high frequency signals over the cables. High frequency signals are considerably attenuated when transmitted over the cables, and signal waveforms are easily distorted, resulting in difficulties when transmitting over long distances (the maximum distance for transmission using twisted-pair cables to connect the hub and terminals with 10Base-T is 100m).

When expanding a LAN, relay devices are used to amplify the attenuated signals. Distorted signals are first converted back to digital format and regenerated to remove the distortion.

To cover even more remote locations, telecommunications companies provide dedicated lines, PSTN lines, and ISDN lines for connection to remote LANs.

Connection between Networks of Different Standards

As the types of cable used, and the signal and data format differ between different LAN systems, such systems cannot be connected directly. When a LAN system has to be connected to a different system, a relay device that can convert between the two systems is employed.

Conversion between different LAN systems involves first converting the signals back to digital format, and resending them in a format appropriate for the destination LAN.

Control of High-speed Transmission Routes

As the network grows, the number of connected computers increases, and so does the volume of data transmitted. There is a limit to the amount of data that can be transmitted on the network. When this is exceeded, the flow of data is impeded and communications are no longer possible.

There are a number of ways to increase the speed of data transmission on a LAN. A high-speed LAN may be used to prevent network congestion when the amount of data to be transmitted is large. When connecting LANs of different transmission speeds, relay devices are required that can convert between the two LAN types.

By-pass circuits may be installed when connecting LANs with relay devices. When there is a complex web-like interconnection of networks, there are a number of routes to the destination, so that busy parts of the network can be by-passed.

Filtering

There are also relay devices that can check the data on the network and remove all except that which is necessary. This is referred to as 'filtering'.

Controls which pass only specific protocols (used for the transmission of data and voice between terminals on networks such as TCP/IP, IPX/SPX, AppleTalk) are used to alleviate congestion in the relay circuits.

As the number of users increases, the network is used for greater variety of purposes, resulting in the entry of data through illegal access. Relay devices to limit access and to maintain security become necessary.

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1.4 TYPES OF RELAY DEVICES AND GATEWAYS

Relay devices may be of various types - repeaters, bridges, switches, routers - depending upon their purpose and principles of operation.

Types of Relay Devices and their Functions

Function	Repeater	Bridge	Switch	Router
Cable extension	◯	◯	◯	◯
Connection with remote sites	✗	◯	✗	◯
Connection with different LAN types	✗	◯	◯	◯
Avoiding congestion	✗	◯	◯	◯
Restricting access	✗	✗	✗	◯

1.4.1 REPEATERS

A repeater amplifies signals. It is normally connected to a number of LANs, and amplifies signals from one LAN (one segment) and outputs it to another LAN (another segment).

It is considerably cheaper than a bridge or router, and does not require special setup. After power is switched on, the repeater connects to the two networks.

As distortion occurs when signals are amplified, the number of repeaters is limited to two with Ethernet.

Repeaters have no ability to store data, and are unable to prevent collisions when sending signals. Therefore, they have no effect on relieving congestion in a network.

Signal

Becomes weaker

LAN

LAN

Repeater
Amplifies the signal
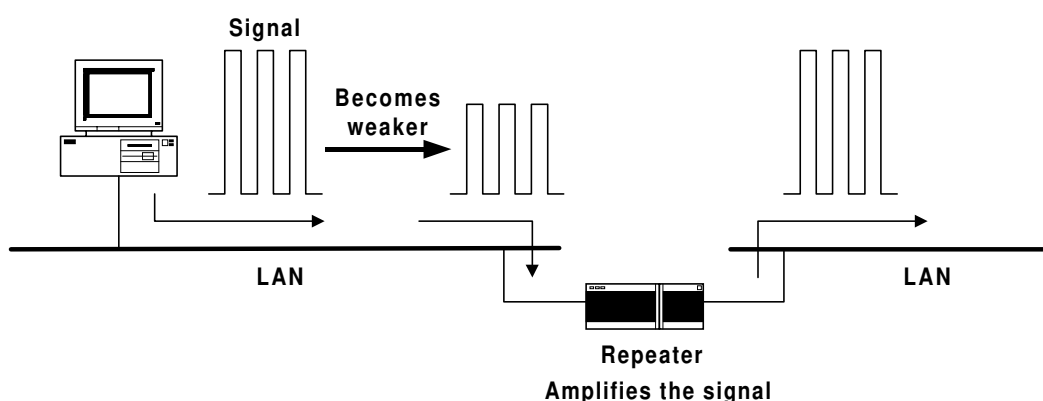
H132X504.WMF

1.4.2 BRIDGES

In the same way as a repeater, a bridge converts received electrical signals back to digital format, and then regenerates the original electrical signals for transmission, thus preventing signal distortion.

Bridges can also filter out unnecessary data, and can act to alleviate congestion on the network. The bridge records the source MAC address in the header of the arriving data packets. In this way, the bridge builds up a picture of the location of each node (PC and printer).

In the example shown below, data sent from A to B also reaches the bridge. The bridge automatically records this data and remembers that A is located in the left-hand segment. When data is subsequently sent from B to A the bridge does not relay it to the right-hand segment. This process is referred to as filtering.

The bridge does not require special setup. After power is switched on, the bridge connects to the two networks.
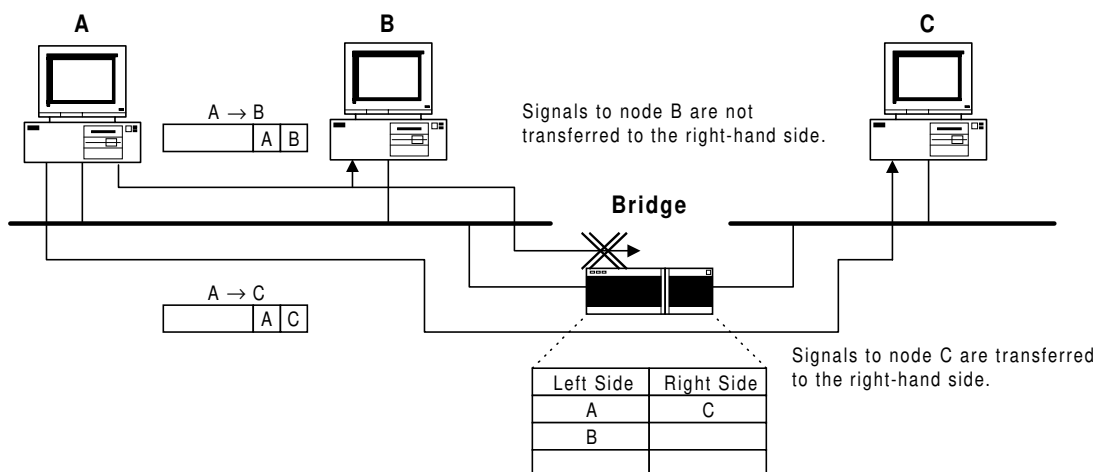
H132X505.WMF

1.4.3 SWITCHES

Switches have the same filtering function as bridges, however they also support simultaneous connection of multiple LANs, and allow parallel relaying.

Relay processing time is reduced in comparison to bridges, and operation is therefore faster.

Switch
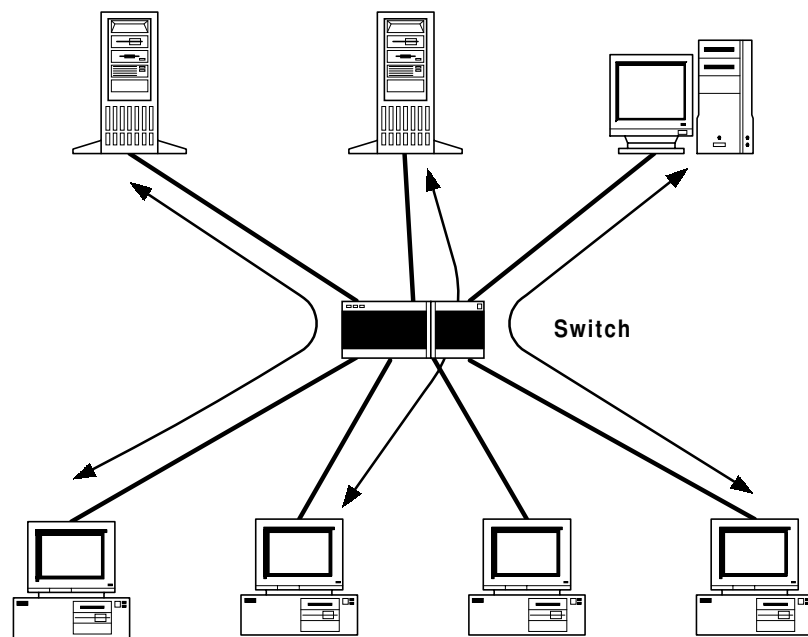
H132X506.WMF

1.4.4 ROUTERS

A router checks the destination information in the headers of the data packets on the network and determines which LAN it has to be sent to. The router contains a table which records the destinations.

Data going to LAN segment A is transferred to the upper route.
Data going to LAN segments B or E is transferred to the left-hand route.
Data going to LAN segments C or D is transferred to the right-hand route

A	Up
B	Left
C	Right
D	Right
E	Left
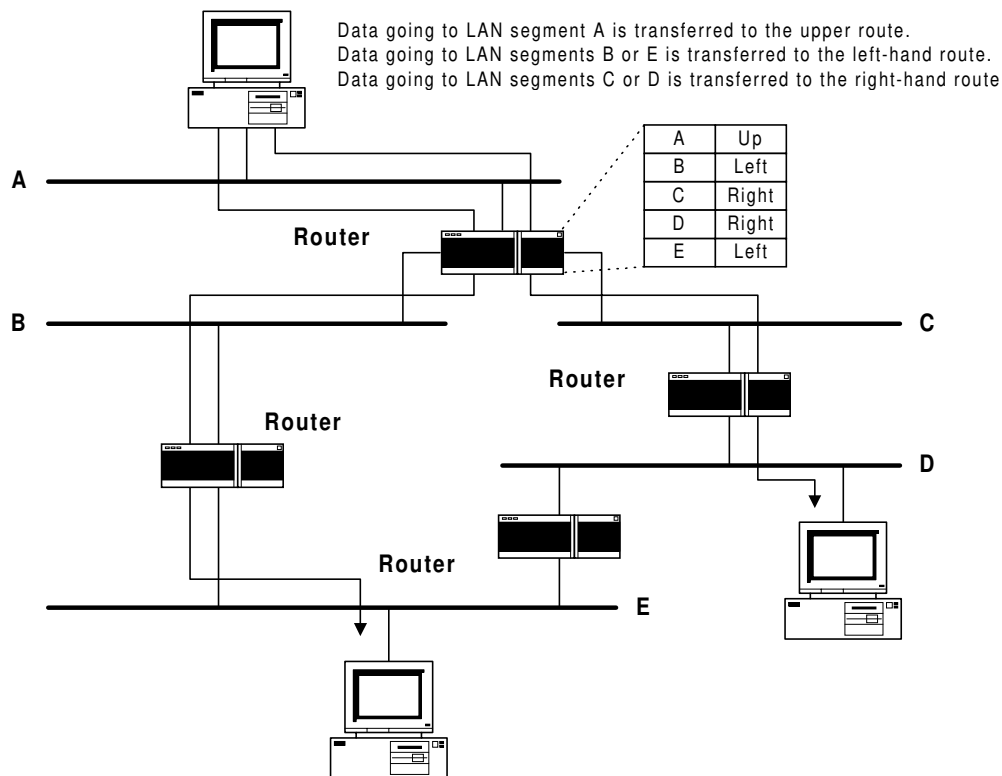
H132X507.WMF

In contrast to repeaters and bridges, simply switching power on and connecting to the networks does not make ready the router for operation. Software appropriate for the communications protocol must first be installed, the network configuration checked, and the setup completed.

While filtering with bridges is implemented primarily by the checking of addresses, filtering with a router is implemented by the communications protocol.

Depending upon the application protocol, the router may be set to pass e-mail data, but not to transfer files.

Routers support considerably more sophisticated functions than bridges. For example, they may be set up to allow high priority data to be passed more quickly (priority control). Different LAN types have different formats for the destinations. The router makes sure that the destination is in the correct format for the next network.

When there are multiple routes to the destination, bridges and switches cannot be employed to reduce congestion since the data is sent via all routes. Routers, on the other hand, employ a number of routes set beforehand in accordance with the amount of data to distribute the load throughout the network (while bridges divide

up the network with MAC addresses, routers achieve this, in the case of a TCP/IP protocol, by analyzing IP addresses and sub-nets).

The router is a device central to the configuration of the network, and as such router functions are implemented in software in PC LAN servers and UNIX machines.

In the NIC fax, the device setting the IP address as the default gateway is in practice a default router. When data is sent from the network belonging to the local machine to other networks, the device at the exit from the network is referred to as the default router.

1.4.5 GATEWAYS

While repeaters, bridges, and routers are available as dedicated hardware for network use, gateways are available as server and client software packages. They analyze all network communications protocols, and convert data, thus allowing connection of different networks. The Netware Gateway Service supplied with the WindowsNT Server is an example of this software.

1.5 NETWORK PROTOCOLS

1.5.1 OVERVIEW

Network protocols are standard procedures for transmitting data over a network. There are different protocols for different stages of the communication.

1.5.2 DATA TRANSMISSION

Data is sent using the following procedures.

  (1) Finding the destination
  (2) Determining the route to the destination
  (3) Sending the data

A number of protocols must be used in combination in order to execute each procedure. The TCP/IP protocol used with the Internet, the Netware IPX/SPX protocol, and the Macintosh AppleTalk protocol, are combinations of protocols designed to achieve various specific procedures.

Protocols used for steps (1), (2), and (3) listed above are referred to as (1) the name service protocol, (2) the routing protocol, and (3) the transfer protocol respectively.

The roles of the protocols

Target PC

Network

Transfer protocol

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Name Server
Directory Server

Router

Routing protocol

Name service protocol

Sending PC

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APPENDIX A-13
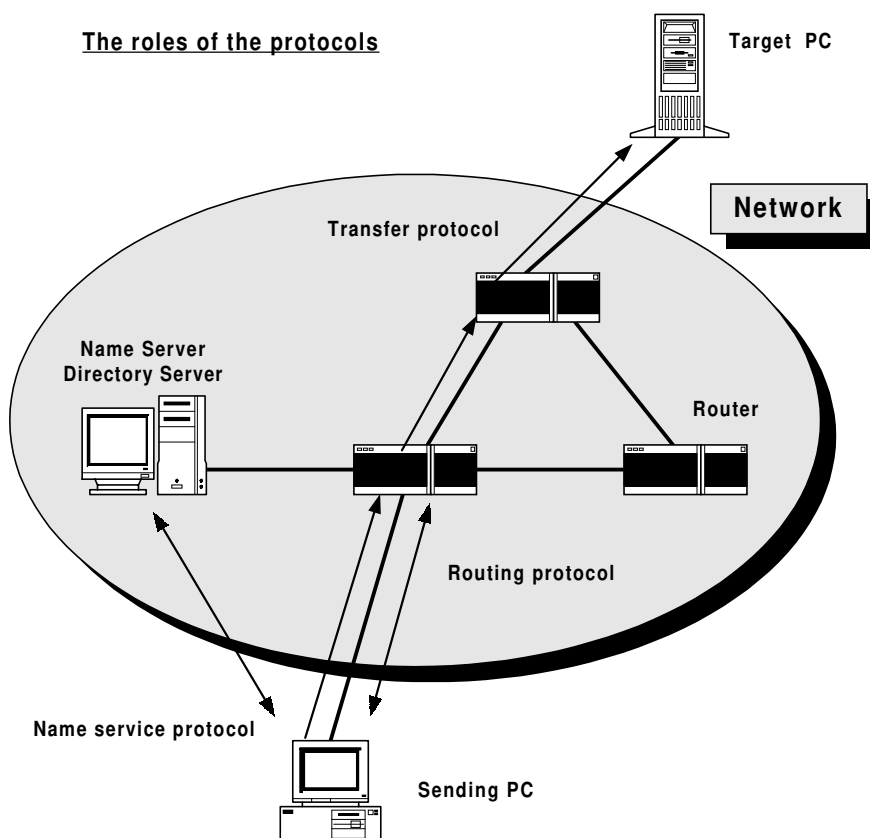
1.5.3 **NAME SERVICE PROTOCOL**

A computer name is normally assigned to the computer. However, for the purposes of transmitting data, the name is converted to an address indicating its location on the network. The name service protocol provides lists of all names when the destination computer name is unknown.

The address is an identifier used in distinguishing between terminals and nodes on the network. The most common addresses are IP addresses and MAC addresses.

An IP address consists of a network address (to identify the network to which the terminal belongs) and a host address (to identify the terminal within the same network), both of which are set by the user.

A MAC address is registered in the memory of the network interface board by the manufacturer. Each MAC address is unique (no two are alike throughout the world).

1.5.4 **ROUTING PROTOCOL**

The routing protocol is used in determining the route used to transmit the data. A preset network route may be necessary, or it may be determined automatically by communication between routers.

If relay devices are to be added or moved, it is convenient to have a method of automatically determining new routes. The routing protocol provides this ability.

1.5.5 **TRANSFER PROTOCOL**

The transfer protocol is used in the transmission of data. It first checks for errors in the received data, and resends it if an error is detected. It also controls the rate at which data is transmitted, by communication between the source and destination.

In addition to these basic protocols, there are also various other protocols which provide for notification of network congestion, notification of errors, and so on.

Protocols Used with Different LAN Types

	Name Service Protocol	**Routing Protocol**	**Transfer Protocol**
Protocols used with the Internet (TCP/IP)	DNS	RIP OSPF	IP TCP UDP
Protocols used with Netware (IPX/SPX)	SAP NDS	RIP NLSP	IPX SPX
Protocols used with Macintosh (AppleTalk)	NBP ZIP	RTMP	DDP ASP

DNS: Domain Name Service
RIP: Routing Information Protocol
OSPF: Open Shortest Path First
IP: Internet Protocol
TCP: Transmission Control Protocol
UDP: User Datagram Protocol
SAP: Service Advertisement Protocol
NDS: NetWare Directory Service

NLSP: NetWare Link State Protocol
IPX: Internetwork Packet Exchange
SPX: Sequenced Packet Exchange
NBP: Name Binding Protocol
ZIP: Zone Information Protocol
RTMP: Routing Table Maintenance Protocol
DDP: Datagram Delivery Protocol
ASP: AppleTalk Session Protocol

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1.6 TCP/IP

1.6.1 OVERVIEW

TCP/IP is the standard Internet protocol, and is supported as a standard by Windows 95. It allocates 32-bit network addresses (IP addresses) to the nodes. As the addressing system does not depend upon physical media, TCP/IP provides for considerable flexibility in selection of routes.

The use of TCP/IP is not limited to Ethernet, but allows use of a variety of physical media.

TCP/IP is a combination of the TCP protocol and IP protocol.

1.6.2 COMMUNICATIONS WITH IP PROTOCOL

The IP protocol divides data into packets. When the destinations may be on several different LANs, the router selects the appropriate route for each packet before it is sent. This process is repeated until all data arrives at the destination network.

1.6.3 IP ADDRESS

Communications with IP protocol requires that network devices such as PCs and routers using TCP/IP be assigned a 32-bit IP address as a means of identification.

When used in a single closed network, the IP addresses (referred to as private addresses in this case) may be used freely. However, when connected to the Internet, global addresses which are unique throughout the world must be used. Global addresses are managed by the Internet Assigned Numbers Authority (IANA), and are assigned upon receipt of an IP address.

1.6.4 IP ADDRESS FORMAT

IP addresses are 32 bits in length, and are normally converted to decimal notation in four 8-bit blocks as shown below.

Example of IP Address Notation

133. 139. 212. 11

Host portion (16 bits)
Network portion (16 bits)
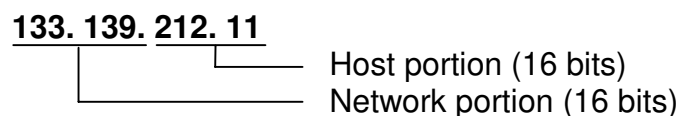
The IP address consists of host and network blocks as shown above. The network block represents a logical collection of hosts (a network), and the host block specifies a unique host within the network.

In the example above, a maximum of 65,534 (the maximum number of combinations of 16 bits) hosts may be allocated to that particular network block.

As TCP/IP involves the routing of packets using the address in this network block, the network block must be unique (no two can be alike throughout the world). On the other hand, the address within the host block is up to the user.

1.6.5 SUBNET AND SUBNET MASKS

Subnet masks divide the host block into sub-nets. In the example above, there are 65,534 possible host addresses, and it is difficult to manage all with one network.

The host address block is therefore subdivided into the upper and lower 8 bits, with the upper 8 bits handled as a logical group address. In this way, the IP addresses assigned to a company for its networks can be divided up into sub-nets of about 250 hosts for ease of management (each department of the company can be allocated a different logical group number, for example).

Example: Sub-net

133. 139. 212. 11

1 ~ 254 ... 254 hosts

Logical group
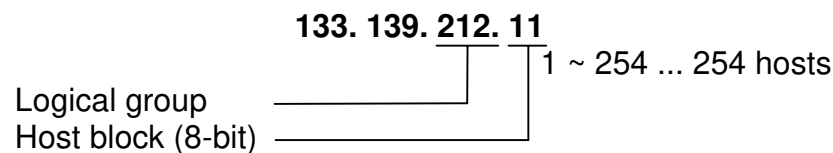
Host block (8-bit)

The final part of the IP address (the host block) cannot be 0 or 255.

The dividing is done using a parameter known as the subnet mask. The subnet mask blocks off addresses, only permitting certain addresses to be used in a subnet.

A logical AND operation is done using the subnet mask to find the range of allowed sub-net addresses.

If your computer has the IP address 210.145.159.11, and the subnet mask is 255.255.255.0, the server can recognize that machines with an IP address of 210.145.159.* are on the same LAN, so messages are sent to it directly. Any IP address with a different value at the start has to be accessed through a router.

The following diagram shows how the AND operation can be used to limit the size of the subnet to a few IP addresses.

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IP address and Subnet mask

IP Address (4 octets)

| 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |

←——— 210 ———→ ←——— 145 ———→ ←——— 159 ———→ ←——— 11 ———→

Subnet mask

←——————————————— 28 bits ———————————————→

| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |

255 ←——— 255 ———→ ←——— 255 ———→ ←——— 240 ———→

←——————————— Logical Network Address ———————————→

14 hosts are available ———

The address "0000" and "1111" cannot be used ——→
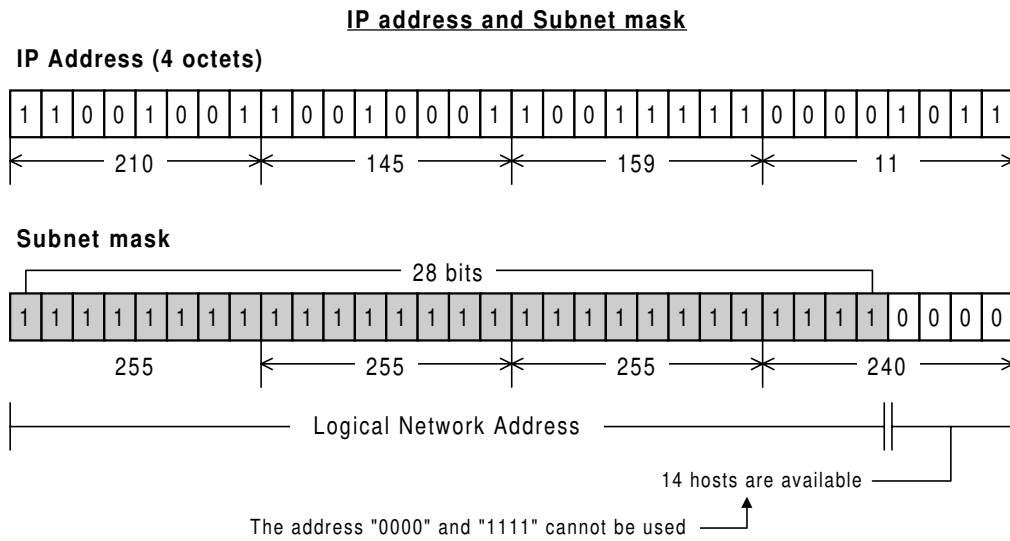
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1.6.6 TCP AND UDP

While data is formatted into packets and sent to the desired node on the Internet using IP, communications applications (eg e-mail) do not control data transmission in packets.

The host requires a procedure for passing IP packets to the desired application. This requirement is satisfied with TCP (Transmission Control Protocol) and UDP (User Datagram Protocol).

APPENDIX B

1. E-MAIL BASICS

1.1 PRINCIPLES

1.1.1 OVERVIEW

Electronic mail (E-mail) is a system by which messages in the form of digital data are sent and received between computers. A variety of types of electronic mail are available - Internet e-mail, Microsoft Mail as used with the exchange client under Windows95, and Lotus Notes Mail.

E-mail works as follows.

- Messages are stored at some location.
- Users generally have equal privileges, and are able to both send and receive messages.

A telephone system requires that users are able talk to each other simultaneously. In the case of e-mail, the user first receives the message, and may then read it at any time, and send a reply if necessary.

1.1.2 SENDING AND RECEIVING

E-mail generally supports the following functions.

- A UA (User Agent) for creating e-mail and displaying received mail.
- An MTA (Message Transfer Agent) to handle transfer of messages.

The mail created by the sending UA is sent from the sending MTA to the receiving MTA, and displayed by the receiving UA.
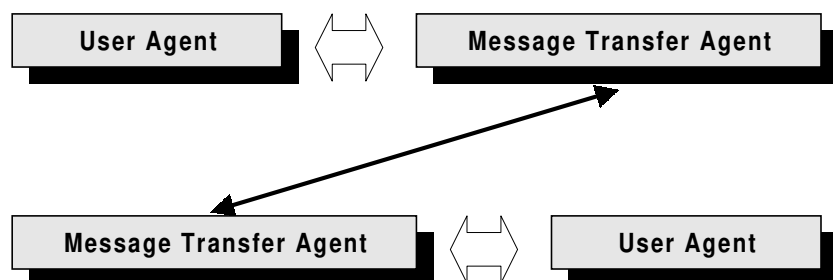
H132X553.WMF

The simplest e-mail system is one in which messages are stored at a location accessible by all users. Each user has his/her own mailbox, and the sender puts messages in the recipient's mailbox. The recipient checks his/her mailbox to receive mail.

The mailboxes are normally at one location, often referred to as a "post office", and the process of sending e-mail approximates that of sending mail at the post office.

When the post office is accessible from all computers connected to the network, the system constitutes an e-mail system.

Microsoft Mail as used in Windows95, and Lotus Cc: Mail employ this system, as does the UNIX local mail system (i.e., not connected to the Internet, etc.).

1.1.3 E-MAIL NETWORKS

As the number of users increases, and geographically distant users are connected to the network, multiple post offices must be established, and users are no longer able to use the same post office for sending and receiving mail. A system which connects post offices for the purpose of exchanging mail (a transfer system) then becomes necessary.

In this case, the destination of mail is checked at the post office, separated into the various destination post offices, and passed it to the transfer system. The transfer system then communicates with the transfer systems of other post offices, and transfers the mail to the appropriate post offices. Mail sent from other post offices is sorted into the appropriate mailboxes at the receiving post office.

The above is a general description of an e-mail system. These functions are implemented with the exchange server software packages for Microsoft Mail and CC: Mail using optional gateway software.

The fundamental principles of Internet mail are the same, and are implemented in the UNIX SendMail program under UNIX.

The following diagram shows what happens when somebody sends mail from a PC to a receiver with an account in the same post office and to a receiver with an account in another post office.

Machines A and B both have accounts in mail server 1. Machine C has an account in mail server 2.

When machine A sends the message, it goes to the local mail server using SMTP protocol. SMTP is based on TCP/IP. The post office transfers the message to receiver B's mail box. Receiver B picks the mail up from there, using POP procedures (POP is also based on TCP/IP).

To get to receiver C, the server sends the mail to mail server 2, using SMTP procedures. Mali server 2 puts the incoming mail into receiver C's mail box. Receiver C picks it up using POP procedures.

Some more detail on SMTP and POP follow later in this section.

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Appendix B
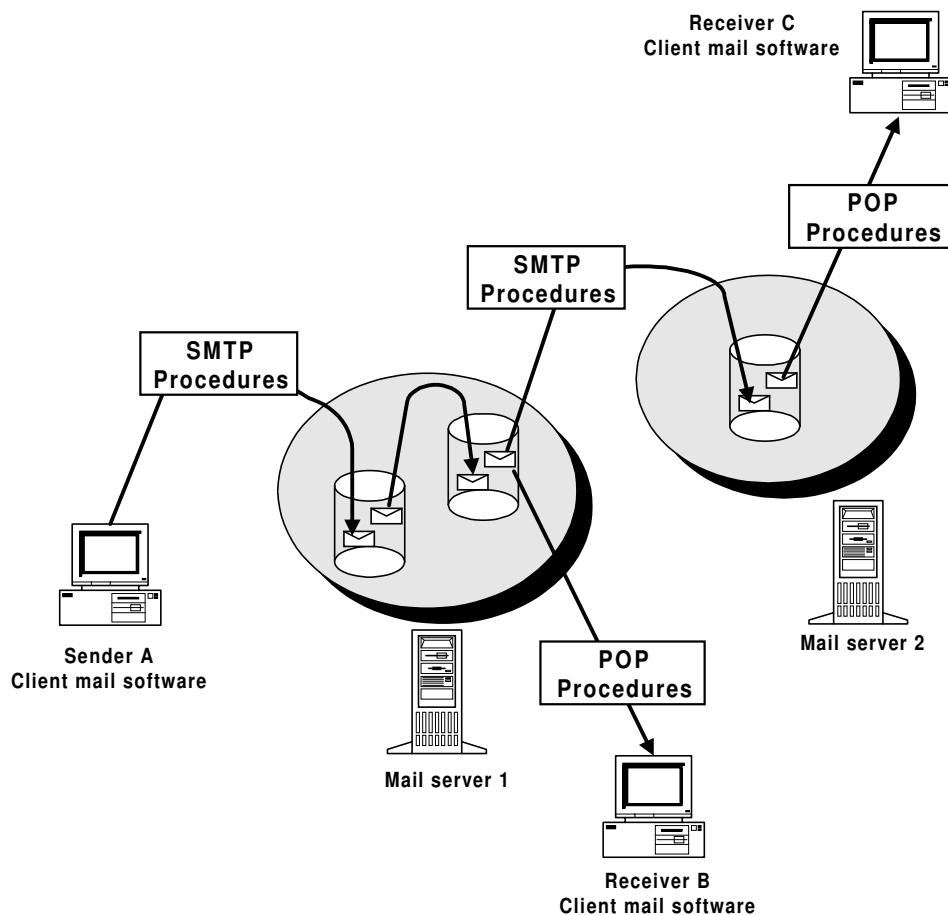
1.2 INTERNET MAIL

1.2.1 OVERVIEW

Internet e-mail (hereafter referred to as Internet mail) is a system for creating text messages in accordance with a set of standards, the messages then being sent to destinations using SMTP (Simple Mail Transfer Protocol).

SMTP is a protocol for sending and receiving mail as defined in RFC821. It was originally developed for sending and receiving mail between servers. However it is currently used for sending mail from client environments using POP (Post Office Protocol – discussed in a separate section).

1.2.2 CHARACTER CODES

Messages consist of a header and the main text, both being subject to restrictions on usable character codes.

Specifications for data exchanged on the Internet are determined within the organization of the Internet, and do not necessarily conform to ISO (International Standards Organization) requirements. However, these organizations have codified these specifications to the extent that they are now the default standards organizations.

For example, the main text of a message created Japanese using JIS character codes must satisfy a particular set of requirements for transmission on the Internet. However, if it is to be sent on a network within a particular company, the unique requirements of that system may mean that the JIS codes are not always used.

1.2.3 MESSAGE ADDRESS NOTATION

The UA attaches the required header to the main text and sends it to the MTA. The MTA then adds to or changes the header as required to ensure that the message transfer route is recorded, and that the addresses of the destination and sender are correct.

Internet mail employs an 'address' to specify the message destination. The address format is generally as follows.

user name @ domain name

The mailbox name is generally employed as the 'user name'.

The MTA uses the 'domain name' to check the destination IP address with the DNS, and then sends the mail using SMTP.

DNS (Domain Name System) is a service which enables the IP address to be obtained from the host name under the TCP/IP network environment.

1.2.4 DNS AND DOMAINS

The IP address allows destinations within the Internet to be identified. This IP address is, however, a string of numbers not easily remembered by the user. To resolve this problem, a corresponding name is added so that the user need only specify the name in order to identify the destination.

DNS was developed for this purpose. Internet domain names are distributed among organizations in a hierarchical manner, with lower order domains being managed by the higher order domain. All organizations participating in the Internet have a domain name. The domain name first identifies countries, and is subsequently further divided in a tree structure to identify organizations.

The name server (DNS server) located in each domain holds the information about the domains and hosts under its management. When the client communicates using a host name or domain name, an inquiry is made to the DNS to obtain the destination IP address. Note that this domain name structure is independent of the physical structure of the network. The items in brackets below are examples of domain and mail addresses.

DNS model

(jp domain)

① b b b   c c c   d d d

(co domain)

② f f f   e e e   g g g

(ricoh domain)

③ host-1   host-2   host-3

host-2.eee.ccc.aaa
(f64g@ricoh. co. jp)

H132X510.WMF

Appendix B
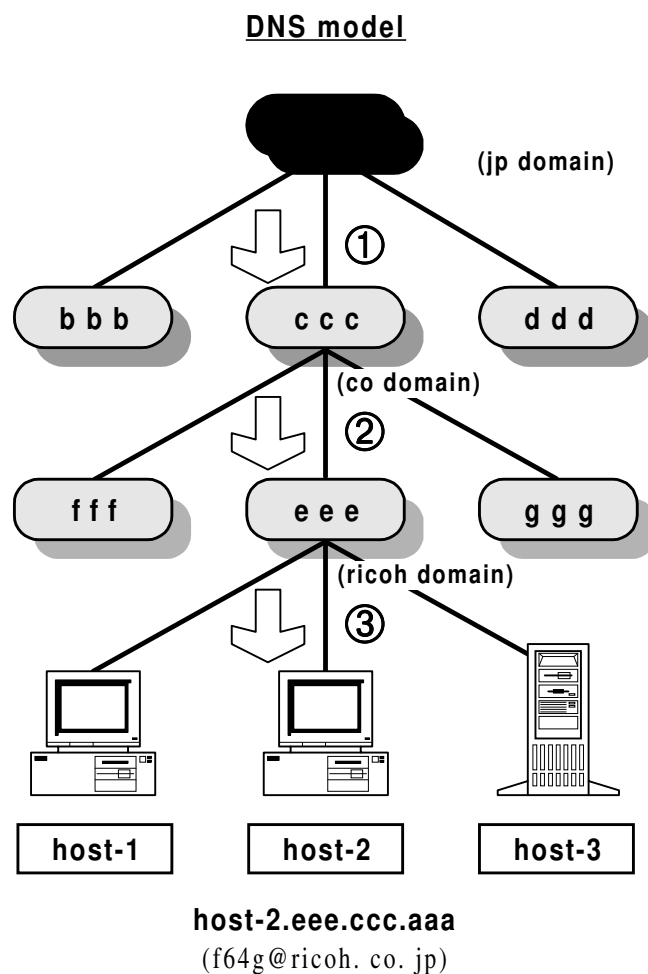
1.2.5 TRANSFER OF INCOMING MAIL

In some cases, incoming mail may be transferred to another server using SMTP and then stored on another mail server.

The UA used by the user receiving this mail detects its arrival by some method (e.g., by monitoring the contents of the directory designated to contain mail) and informs the user of this fact.

The UA then extracts the mail in accordance with instructions from the user and displays it.

The mail stored on the server is transferred to the user's PC using POP.

POP (Post Office Protocol) is a protocol used in reading the content of the mail spooler using TCP/IP protocol. It is specified in RFC1725 (see a later section for more details).

E-mail transration

name@ aaa. ccc. ddd
└─ user name   └─ domain name

① DNS → DNS
② MTA (DNS to MTA)
③ MTA → MTA (SMTP)
④ MTA → MTA

SMTP

H132X554.WMF
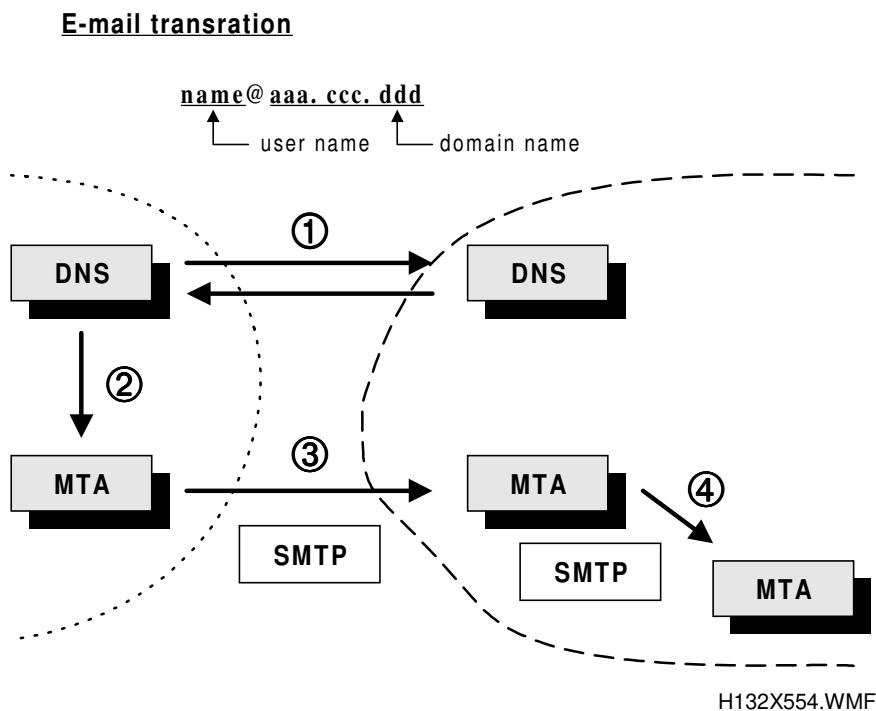
The mail address consists of a host name (mailbox name) and domain name. Mail is distributed by first finding the IP address of the destination with the DNS, and then transferring the message using SMTP.

1. The mail destination within the relevant domain is checked using the domain portion of the mail address.

2. The MTA then connects to the destination mail server using the mail address thus obtained.

3. The mail is transferred to the destination MTA using SMTP.

4. Depending upon the size of the organization, the message may be further transferred to an internal MTA (not visible from outside the domain).

1.2.6 VERIFYING INCOMING MAIL

Arrival of mail at the intended destination on the Internet is not guaranteed. In the worst case, it may disappear at some unknown location. Furthermore, it is impossible to verify whether sent mail has been read or not.

Mail sent on the Internet passes through multiple servers and networks, and computers used within the Internet are of a variety of architectures. The network therefore contains a wide variety of hardware environments, in addition to the wide variety of software employed for mail transfer.

While there are no problems in most cases, it is obvious that arrival of mail cannot be completely guaranteed within this complex environment.

Appendix B

1.3 MESSAGE HEADERS

1.3.1 REQUESTS FOR COMMENTS

The basic protocols used for transmission of messages on the Internet are defined in RFC822. RFC822 primarily defines the header information for e-mail, with the details of the main text of the message being defined in MIME (RFC2045 - 2047).

NOTE: 1) An RFC (Request For Comments) is a document formally released by the Internet Engineering Task Force (IETF). The IETF has released a wide variety of RFCs on technical matters (e.g., network protocols) related to the Internet environment.

2) MIME (Multipurpose Internet Mail Extensions) is a protocol which removed such restrictions as the number of characters per line, and the maximum size of an e-mail transmission. It also made possible the transmission of non-character data (e.g., programs and bitmaps).

1.3.2 HEADER FORMAT

The header of an e-mail message consists of a header and the main text. A blank line is inserted between this header and the main text (the blank line is not included in the header).

The header is defined as a collection of fields, with the field format as follows.

field name ":" content

An example of the 'To' field, indicating the destination, is as follows.

To:XXX@ricoh.com

Header Example:

Received: from F64G.shinyoko.ricoh.co.jp ([133.139.167.30]) by bb.shinyoko.ricoh.co.jp (4.1/2.8Wb-91Jan07)

    id AA15193; Sun, 15 Feb 98 14:53:50 JST

Return-Path: <f64g@shinyoko.ricoh.co.jp>

Message-Id: <9802150553.AA15193@bb.shinyoko.ricoh.co.jp>

Date: 15 Feb 1998 14:54:06 +0900

X-Mailer: ICFAX Version 1.0

Mime-Version: 1.0

Content-Type: multipart/mixed; boundary = "--ICFAX_60670AE6CB--"

To: hanako@shinyoko.ricoh.co.jp

From: f64g@shinyoko.ricoh.co.jp

Subject: Fax Message NO.0003 from "+81454771786"

("RICOH SERVICE")

1.3.3 HEADER TYPES

While a number of header fields are possible, the following three must be present.
- Date
- From
- To

Message Header Table (fields defined in RFC822)

Field	Field name	Meaning	Description
Date	Date	Date that the mail was created	Date and time in specified format Syntax: <address>
Person submitting mail	From	Person submitting mail	Mail address (including comments) Syntax: <address>
Address	Sender	Person sending mail	Mail address (including comments) Syntax: <address>
	Reply-To	Destination when a reply is sent	Mail address (including comments) Syntax: <address>
	To	Mail destination	Mail address (including comments) Syntax: <address>
	Cc	Destination of carbon copy	Mail address (including comments) Syntax: <address>
	Bcc	Destination addressees not covered by To and CC	Mail address (including comments) Syntax: <address>
Reference	Message-Id	Message ID	Message identification
	In-Reply-To	Source of reply	Message ID of original mail
	References	Referenced mail	Message ID of referenced mail
	Keywords	Keywords for search purposes	Any character string
Other	Subject	Mail title (summary)	Any character string
	Comments	Mail comment	Any character string
	Encrypted	Encryption algorithm specification	Defined word (defined in separate RFC)
Route	Return-Path	Route for return of mail	Mail address
	Received	Transfer record added by MTA	Describes transfer destination, transfer source, and protocol etc with From, By, With, etc
User defined		Fields defined by user	Field names beginning with X-. May be any character string, definition is up to the user.

* Other fields are available defined by separate RFCs (e.g., MIME).

Appendix B

1.3.4 FIELDS FOR SENDING E-MAIL

From Field

The From field indicates the person sending the mail. The difference between the From and Sender fields is that between 'the person creating the message' and 'the person actually sending the message'. These two fields are used when the two differ. When the From field is omitted, the Sender field is added automatically.

When a error occurs, a error notification is sent to the destination in the Sender field. When the Sender field has been omitted, the notification is sent to the destination in the From field.

Fields containing mail addresses may also include real names as a comment (the same applies to the Person Sending Mail and Addressee fields). In both cases below , 'IC FAX' is handled as a comment, and f64g@ricoh.com is recognized as the address.

Example 1 From: IC FAX <f64g@ricoh.com>

Example 2 From: f64g@ricoh.com (IC FAX)

Multiple mail addresses may be delineated by commas, and both address formats may be used together.

Reply-To Field

Reply-To clearly specifies the address to which the reply is to be sent. As this field may be omitted, it is possible that mail may be sent with this field blank. In such cases, the mail is returned to the address in the From field.

When both the From and Reply-To fields are used, the latter has priority.

The Return-Path field appears to have a similar function at first glance,. However it is not for return of mail, but is automatically added by the transfer system to specify the person submitting the mail, and is used to investigate the mail route when an error occurs.

1.3.5 ADDRESSEE FIELDS

To Field

The To field specifies the addressee for the mail. As with the From field, multiple mail addresses may be delineated with commas. The To field differs from the Cc field in that only the name of the person sending the message is specified.

Cc Field

Mail is sent to the addresses in the Cc (carbon copy) field in the same way as to the address in the To field. The difference only with the To field is whether the name is in the To field or the Cc field of the received mail.

Bcc Field

Bcc means Blind Carbon Copy. The Bcc field is deleted in mail sent to the addressees in the To and Cc fields. It is most commonly used when the address of the person sending the mail (the user in the From field) is to be entered in order to leave a copy of the sent mail.

As some mail software saves a copy of the sent mail, it may not be possible to specify the Bcc field in some cases.

Exceptions

The addressee fields do not always contain the addressee's name when mail is received. This is because since the actual addressee for the mail is specified by the MTA, when an alias is used to create a virtual addressee (in a local system, for example), the virtual address remains in the To field. This also occurs in cases such as mailing lists in which mail is sent to all on the mailing list.

NOTE: 1) An alias is a group address. Mail sent to the group address is sent to all members in the group.
2) A mailing list is a form of electronic conference using e-mail. E-mail sent to a mailing list is transferred to each member of the list. As such, it provides the same service as available with a PC-based centralized host-type bulletin board system in a distributed network environment.

1.3.6 DATE

The Date field indicates the date on which the mail was created (not the date it was sent). The date is in the following format.

Day, date month year hour: minute: second zone

Zone indicates the local time used in the system in which the mail was created, and is expressed as GMT+/-hhmm.

1.3.7 MISCELLANEOUS

Received Field

The Received field is used by the MTA sending the mail, to record the status of the mail. This field shows the route over which the mail was sent, and the computers which handled it prior to delivery.

In addition to information showing when and where the mail originated, and where it was sent to, some systems add further information (e.g., host IP address, software version) as a comment.

Message-Id Field

Internet mail adds an internationally unique message ID. This ID is created automatically, and is normally a combination of the time the message was sent and the name of the mail server.

Appendix B

1.4 SMTP

1.4.1 OVERVIEW

SMTP (Simple Mail Transfer Protocol) is used as the protocol for communication between Internet mail MTAs. It is defined in RFC821, which covers 8-bit data communications and message size negotiation, etc. SMTP is expanded upon in RFC1651 and RFC1653 as ESMTP.

SMTP uses text-based commands and responses between the client and server. In practice, it is a protocol used under TCP/IP, and data is therefore sent and received under TCP. Retry processing with communications errors is therefore handled at the TCP/IP level, and SMTP therefore needs only to handle sending and receiving of data, and command errors.

1.4.2 SMTP COMMANDS

SMTP commands are sent, and responses received, between the client and server when sending Internet mail. This communication involves sending of the domain name, sender's name, destination name, and main text etc to the server, and user verification.

H132X509.WMF

APPENDIX B-12
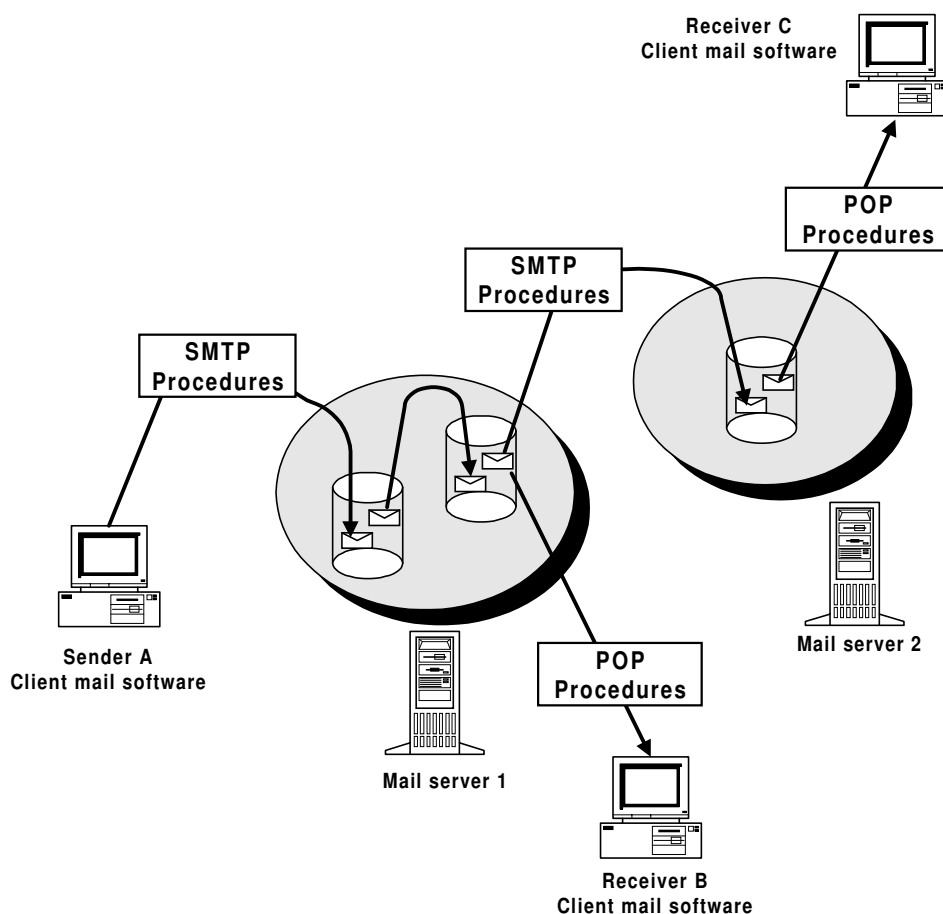
1.5 POP

1.5.1 OVERVIEW

E-mail on the Internet was originally transferred between hosts using SMTP, with the computer receiving the mail being operated all day long under the control of SMTP.

In practice, the use of dial-up IP connections to connect to the mail server via telephone lines, and the fact that the power supply may be switched off when the user returns home in the case of PC clients, means that mail cannot be transferred until the user connects to the server.

POP (Post Office Protocol) servers are used in such cases, i.e., when the connection is not permanently established.

1.5.2 POP SERVER CONFIGURATION

The POP server is a computer which receives user mail using SMTP. The mail for the user includes a setting to ensure that it is directed to the POP server.

Following connection to the Internet, the user receives e-mail directed to the server with POP procedures.

As with SMTP, POP is text-based, and as such sends command lines and receives responses, as well as sending instructions for user identification by clients, transmission of passwords, acquisition of mail, and deletion of mail on the server.

Appendix B

1.6 MIME

1.6.1 OVERVIEW

Audio messages and image files cannot be sent without further processing, if mail is restricted solely to characters.

MIME (Multipurpose Internet Mail Extensions) is a specification for the inclusion of various types of data in e-mail, and currently supported by almost all e-mail software for attachment of files.

MIME is defined in RFCs 2045 - 2049.

1.6.2 MIME FUNCTIONS

MIME supports the following functions.

- Inclusion of multiple objects in e-mail. other than text, each able to be handled at the receiving end.
- Binary encoding.
- Insertion of non-ASCII code characters (eg names in Japanese) in the header.

As MIME is a set of conventions which dictate how the main text of the message is to be handled, it employs a character string, referred to as the MIME header, to specify the content and method of encoding used, and to identify whether or not MIME is used in the mail.

1.6.3 MIME HEADER

Messages using MIME contain a header field as follows.

MIME-Version: 1.0

The use or not of this field determines whether or not the main text of the message follows the MIME conventions. Currently, only Version 1.0 of MIME exists.

<u>MIME Header</u>

Header	Meaning	Format
MIME-Version	Indicates that the message uses MIME	MIME-Version: 1.0
Content-Type	Message data type	Content-Type: Type/Subtype [;parameter]
Content-Transfer-Encoding	Encoding method used when sending data	Content-Transfer-Encoding: Encodingtype
Content-ID	A unique data ID. Uses the message ID.	Content-ID: Message ID
Content-Description	Data description	Content-Description: "This is MIME Data"
Content-	MIME header for future expansion	—

[Content-Type] is added to the header to indicate that a message is in MIME format. The [Content-Transfer-Encoding] header is also added as necessary to indicate how the data has been encoded. As some types of data do not require encoding, the [Content-Transfer-Encoding] header is not always required.

The [Content-Description] header is used when including comments. The content of this header is interpreted as comments referring to the content of the message, and has no effect on operation of the software.

1.6.4 DATA TYPES SUPPORTED WITH MIME

The following data types may be specified in the [Content-Type] header.
- Text: Information consisting of characters. The ISO-2022-JP character code set is used in Japan, while US-ASCII is used for ASCII codes.
- Image: Still images such as GIF and JPEG data.
- Audio: Audio information.
- Video: Digital animation such as animation and MPEG.
- Application: Various application files and standard data formats.
- Multipart: Main text which includes multiple objects. A MIME header is also added within the message to record other messages. Use of this data type allows sound, animation, and messages to be included in the same e-mail message.
- Message: Text message information.

1.6.5 MULTIPART

A data type which allows inclusion of multiple data items (objects). It allows for the inclusion of text and attached files in messages, and is the most commonly used type.

Multipart indicates the inclusion of multiple parts (data) in the main text, while the Contents-Type header indicates how the individual parts are handled.

Multipart supports the following sub-types to indicate the relationship between the individual parts.
- Mixed: The message consists of multiple independent parts.
- Alternative: The message consists of multiple parts of the same content, but in different format.
- Parallel: The message consists of multiple parts which are reproduced and displayed simultaneously.
- Digest: A collection of RFC822-format messages in digest format.

Appendix B

Example: Received Multipart Mail Header

Received: from f64g.shinyoko.ricoh.co.jp ([133.139.167.30]) by bb.shinyoko.ricoh.co.jp (4.1/2.8Wb-91Jan07)

      id AA15193; Sun, 15 Feb 98 14:53:50 JST

Return-Path: <f64g@shinyoko.ricoh.co.jp>

Message-Id: <9802150553.AA15193@bb.shinyoko.ricoh.co.jp>

Date: 15 Feb 1998 14:54:06 +0900

X-Mailer: ICFAX Version 1.0

Mime-Version: 1.0

Content-Type: multipart/mixed; boundary = "--ICFAX_60670AE6CB--"

To: taro@shinyoko.ricoh.co.

From: f64g@shinyoko.ricoh.co.jp   **Mail header**

Subject: Fax Message NO.0003 from "+81454771786"

("RICOH SERVICE")

text message here

----ICFAX_60670AE6CB--

Content-Type: image/tiff; name = "FAX.TIF"

Content-Transfer-Encoding: base64   **Part header**

Content-Discription: "FAX.TIF"

SUkqAAgAAAARAP4ABAABAAAAgAAAAABBAABAAAAwAYAAAEBBAABAAAAggQ
AAAIBAwABAAAAAQAAAMBAwABAAAAwAAAAYBAwABAAAAAAAAAoBAwAB
AAAAAgAAABEBBAABAAAA6gAAABUBAwABAAAAAQAAABYBBBAABAAAAggQAABc
BBAABAAAA7FwAABoBBQABAAAA2gAAABsBBQABAAAA4gAAACQBBAABAAAABAA
AACgBAwABAAAAAgAAACkBAwACAAAAAAABADEBAgAEAAAAICAgIAAAAADIAAA
AAQAAAGQAAAABAAAAAICWUG1JAYCWUG1JAYA6XQlVNAqxa5L5Sa8AgEktODg4I
WwuCCGOPMJQpVUFgSUU0risFhyDBBMRXPRSM0czZRVlJhLoRid2yafCjODgCNYmUC
HEpR8AgEmxOC7H5ThDwcdZLzHXqpfk9bOjWQGAslkBgLJZAYCyWQGAslkBgLJZAYC
yWQGAslkBgLJZAYCyWQGAslkBgLJZAYCyWQGAslkBgLJZAYCyWQGAslkBgLJZAYC
yWQGAslkBgLJZAYCyWQGAslkBgLJZAYCyWQGAslkBgLJZAYCyWQGAslkBgLJZAYC
yWQGAslkBgLJZAYCyWQGAslkBAA==

----ICFAX_60670AE6CB----

A Multipart message contains multiple parts, with the strings which delineate these parts being specified with the boundary parameter.

Each part is delineated with

        --boundary_string

and the final part is indicated with

        --boundary_string--

1.6.6 BINARY DATA ENCODING

The binary data m1ust be encoded as character strings in order to insert a binary file into a text message. In Internet mail, non-ASCII data such as single-byte Katakana in Japanese is not sent correctly.

This encoding method is indicated in the [Content-Transfer-Encoding] field in the MIME header. The following encoding methods may be specified in the [Content-Transfer-Encoding] field.

- 7-bit: 7-bit code (8th not used)
- 8-bit: Full 8 bits used
- Binary: Binary data
- Base64:   Encoding of binary data in base64 notation
- Quoted Printable: Encoding of character subject binary data

Of the above, only 7-bit, Quoted Printable, and Base64 are normally used with e-mail. Other encoding methods cannot be used unless they are supported over the network.

1.6.7 BASE 64

Base 64 is commonly supported in e-mail application software for the transmission of binary data.

This method of encoding takes each six bits of the original binary data and converts it to numbers between 0 and 63, each of these numbers being assigned to one of 64 characters (26 upper case characters of the alphabet, 26 lower case characters of the alphabet, the numbers 0~9, and the + and / symbols).

Appendix B

APPENDIX C

1. MAIL POROTOCOL

1.1 SMTP COMMANDS

Command	Syntax	Responses
HELO (Hello)	HELO <domain>	S:250 <domain> E:500,501,421
	This command is used to identify the sender-SMTP to the receiver-SMTP. The argument field contains the host name of the sender-SMTP. The receiver-SMTP identifies itself to the sender-SMTP in the connection greeting reply, and in the response to this command. This command and an OK reply to it confirm that both the sender-SMTP and the receiver-SMTP are in the initial state, that is, there is no transaction in progress and all state tables and buffers are cleared.	
MAIL (Mail)	MAIL FROM:<reverse-path>	S:250 F:552, 451, 452
	This command tells the SMTP-receiver that a new mail transaction is starting and to reset all its state tables and buffers, including any recipients or mail data. It gives the reverse-path which can be used to report errors. If accepted, the receiver-SMTP returns a 250 OK reply. The <reverse-path> can contain more than just a mailbox. The <reverse-path> is a reverse source routing list of hosts and source mailbox. The first host in the <reverse-path> should be the host sending this command.	
RCPT (Recipient)	RCPT TO:<forward-path>	S:250, 251 F:550, 551, 552, 553, 450, 451, 452 E:500,501,503
	This command gives a forward-path identifying one recipient. If accepted, the receiver-SMTP returns a 250 OK reply, and stores the forward-path. If the recipient is unknown the receiver-SMTP returns a 550 Failure reply. This second step of the procedure can be repeated any number of times. The <forward-path> can contain more than just a mailbox. The <forward-path> is a source routing list of hosts and the destination mailbox. The first host in the <forward-path> should be the host receiving this command.	

Appendix C

Command	Syntax	Responses
DATA (Data)	DATA	I:354 F:451, 554 E:500, 501, 503, 421 after transmitting data; S:250 F:552, 554, 451, 452
	If accepted, the receiver-SMTP returns a 354 Intermediate reply and considers all succeeding lines to be the message text. When the end of text is received and stored the SMTP-receiver sends a 250 OK reply. Since the mail data is sent on the transmission channel the end of the mail data must be indicated so that the command and reply dialog can be resumed. SMTP indicates the end of the mail data by sending a line containing only a period. A transparency procedure is used to prevent this from interfering with the user's text. **NOTE:** The mail data includes the memo header items such as Date, Subject, To, Cc, From [2]. The end of mail data indicator also confirms the mail transaction and tells the receiver-SMTP to now process the stored recipients and mail data. If accepted, the receiver-SMTP returns a 250 OK reply. The DATA command should fail only if the mail transaction was incomplete (for example, no recipients), or if resources are not available.	
SEND (Send)	SEND FROM:<reverse-path>	S:250 F:552, 451, 452 E:500, 501, 502, 421
	The SEND command requires that the mail data be delivered to the user's terminal. If the user is not active (or not accepting terminal messages) on the host a 450 reply may returned to a RCPT command. The mail transaction is successful if the message is delivered the terminal.	
SOML (Send or mail)	SOML FROM:<reverse-path>	S:250 F:552, 451, 452 E:500, 501, 502, 421
	The Send Or Mail command requires that the mail data be delivered to the user's terminal if the user is active (and accepting terminal messages) on the host. If the user is not active (or not accepting terminal messages) then the mail data is entered into the user's mailbox. The mail transaction is successful if the message is delivered either to the terminal or the mailbox.	
SAML (Send and mail)	SAML FROM:<reverse-path>	S:250 F:552, 451, 452 E:500, 501, 502, 421
	The Send And Mail command requires that the mail data be delivered to the user's terminal if the user is active (and accepting terminal messages) on the host. In any case the mail data is entered into the user's mailbox. The mail transaction is successful if the message is delivered the mailbox.	
RSET (Reset)	RSET	S:250 E:500, 501, 504, 421
	This command specifies that the current mail transaction is to be aborted. Any stored sender, recipients, and mail data must be discarded, and all buffers and state tables cleared. The receiver must send an OK reply.	

APPENDIX C-2

Command	Syntax	Responses
VRFY (Verify)	VRFY <user name>	S:250, 251 <full name of user> F:550, 551, 533 E: 500, 501, 502, 504, 421
	This command asks the receiver to confirm that the argument identifies a user. If it is a user name, the full name of the user (if known) and the fully specified mailbox are returned. This command has no effect on any of the reverse-path buffer, the forward-path buffer, or the mail data buffer.	
EXPN (Expand)	EXPN <mailing list>	S:250 F:550 E: 500, 501, 502, 504, 421
	This command asks the receiver to confirm that the argument identifies a mailing list, and if so, to return the membership of that list. The full name of the users (if known) and the fully specified mailboxes are returned in a multiline reply. This command has no effect on any of the reverse-path buffer, the forward-path buffer, or the mail data buffer.	
HELP (Help)	HELP [command]	S:211, 214 E: 500, 501, 502, 504, 421
	This command causes the receiver to send helpful information to the sender of the HELP command. The command may take an argument (e.g., any command name) and return more specific information as a response. This command has no effect on any of the reverse-path buffer, the forward-path buffer, or the mail data buffer.	
NOOP (No operation)	NOOP	S:250 E:500, 421
	This command does not affect any parameters or previously entered commands. It specifies no action other than that the receiver send an OK reply. This command has no effect on any of the reverse-path buffer, the forward-path buffer, or the mail data buffer.	
QUIT (Quit)	QUIT	S:221 E:500
	This command specifies that the receiver must send an OK reply, and then close the transmission channel. The receiver should not close the transmission channel until it receives and replies to a QUIT command (even if there was an error). The sender should not close the transmission channel until it send a QUIT command and receives the reply (even if there was an error response to a previous command). If the connection is closed prematurely the receiver should act as if a RSET command had been received (canceling any pending transaction, but not undoing any previously completed transaction), the sender should act as if the command or transaction in progress had received a temporary error (4xx).	

Appendix C

Command	Syntax	Responses
TURN (Turn)	TURN	S:250 F:502 E:500, 503
	This command specifies that the receiver must either (1) send an OK reply and then take on the role of the sender-SMTP, or (2) send a refusal reply and retain the role of the receiver-SMTP. If program-A is currently the sender-SMTP and it sends the TURN command and receives an OK reply (250) then program-A becomes the receiver-SMTP. Program-A is then in the initial state as if the transmission channel just opened, and it then sends the 220 service ready greeting. If program-B is currently the receiver-SMTP and it receives the TURN command and sends an OK reply (250) then program-B becomes the sender-SMTP. Program-B is then in the initial state as if the transmission channel just opened, and it then expects to receive the 220 service ready greeting. To refuse to change roles the receiver sends the 502 reply.	

Remarks:

S: Successful

E: Error

F: Failure

I: Intermediate

1.2 SMTP RESPONSE COMMANDS

Reply codes	Meaning
211	System status, or system help reply
214	Help message [Information on how to use the receiver or the meaning of a particular non-standard command; this reply is useful only to the human user]
220	<domain> Service ready
221	<domain> Service closing transmission channel
250	Requested mail action okay, completed
251	User not local; will forward to <forward-path>
354	Start mail input; end with <CRLF>.<CRLF>
421	<domain> Service not available, closing transmission channel [This may be a reply to any command if the service knows it must shut down]
450	Requested mail action not taken: mailbox unavailable [E.g., mailbox busy]
451	Requested action aborted: local error in processing
452	Requested action not taken: insufficient system storage

Reply codes	Meaning
500	Syntax error, command unrecognized [This may include errors such as command line too long]
501	Syntax error in parameters or arguments
502	Command not implemented
503	Bad sequence of commands
504	Command parameter not implemented
550	Requested action not taken: mailbox unavailable [E.g., mailbox not found, no access]
551	User not local; please try <forward-path>
552	Requested mail action aborted: exceeded storage allocation
553	Requested action not taken: mailbox name not allowed [E.g., mailbox syntax incorrect]
554	Transaction failed

1.3 POP COMMANDS

Command	Syntax	Responses
USER	USER <name>	+OK name is a valid mailbox -ERR never heard of mailbox name
	To authenticate using the USER and PASS command combination, the client must first issue the USER command. If the POP3 server responds with a positive status indicator ("+OK"), then the client may issue either the PASS command to complete the authentication, or the QUIT command to terminate the POP3 session. If the POP3 server responds with a negative status indicator ("-ERR") to the USER command, then the client may either issue a new authentication command or may issue the QUIT command. The server may return a positive response even though no such mailbox exists. The server may return a negative response if mailbox exists, but does not permit plain text password authentication.	
PASS	PASS <password>	+OK maildrop locked and ready -ERR invalid password -ERR unable to lock maildrop
	When the client issues the PASS command, the POP3 server uses the argument pair from the USER and PASS commands to determine if the client should be given access to the appropriate maildrop. Since the PASS command has exactly one argument, a POP3 server may treat spaces in the argument as part of the password, instead of as argument separators.	

Appendix C

Command	Syntax	Responses
QUIT	QUIT	+OK -ERR some deleted messages not removed
	The POP3 server removes all messages marked as deleted from the maildrop and replies as to the status of this operation. If there is an error, such as a resource shortage, encountered while removing messages, the maildrop may result in having some or none of the messages marked as deleted be removed. In no case may the server remove any messages not marked as deleted. Whether the removal was successful or not, the server then releases any exclusive-access lock on the maildrop and closes the TCP connection.	
STAT	STAT	+OK nn mm
	The POP3 server issues a positive response with a line containing information for the maildrop. This line is called a "drop listing" for that maildrop. In order to simplify parsing, all POP3 servers are required to use a certain format for drop listings. The positive response consists of "+OK" followed by a single space, the number of messages in the maildrop, a single space, and the size of the maildrop in octets. This memo makes no requirement on what follows the maildrop size. Minimal implementations should just end that line of the response with a CRLF pair. More advanced implementations may include other information. Note that messages marked as deleted are not counted in either total.	
LIST	LIST [message number]	+OK scan listing follows -ERR no such message
	If an argument was given and the POP3 server issues a positive response with a line containing information for that message. This line is called a "scan listing" for that message. If no argument was given and the POP3 server issues a positive response, then the response given is multi-line. After the initial +OK, for each message in the maildrop, the POP3 server responds with a line containing information for that message. This line is also called a "scan listing" for that message. If there are no messages in the maildrop, then the POP3 server responds with no scan listings--it issues a positive response followed by a line containing a termination octet and a CRLF pair. Note that messages marked as deleted are not counted in either total.	
RETR	RETR <message number>	+OK message follows -ERR no such message
	If the POP3 server issues a positive response, then the response given is multi-line. After the initial +OK, the POP3 server sends the message corresponding to the given message-number, being careful to byte-stuff the termination character (as with all multi-line responses).	
DELE	DELE <message number>	+OK message deleted -ERR no such message
	The POP3 server marks the message as deleted. Any future reference to the message-number associated with the message in a POP3 command generates an error. The POP3 server does not actually delete the message until the POP3 session enters the UPDATE state.	

APPENDIX C-6

Command	Syntax	Responses
NOOP	NOOP	+OK
	The POP3 server does nothing, it merely replies with a positive response.	
LAST	LAST	+OK nn
	The POP3 server issues a positive response with a line containing the highest message number which accessed. Zero is returned in case no message in the maildrop has been accessed during previous transactions. A client may thereafter infer that messages, if any, numbered greater than the response to the LAST command are messages not yet accessed by the client.	
RSET	RSET	+OK
	If any messages have been marked as deleted by the POP3 server, they are unmarked. The POP3 server then replies	
TOP	TOP <message number> <number of lines>	+OK top of message follows -ERR no such message
	If the POP3 server issues a positive response, then the response given is multi-line. After the initial +OK, the POP3 server sends the headers of the message, the blank line separating the headers from the body, and then the number of lines of the indicated message's body, being careful to byte-stuff the termination character (as with all multi-line responses). Note that if the number of lines requested by the POP3 client is greater than the number of lines in the body, then the POP3 server sends the entire message.	
APOP	APOP <name> <digest>	+OK maildrop locked and ready -ERR permission denied
	Normally, each POP3 session starts with a USER/PASS exchange. This results in a server/user-id specific password being sent in the clear on the network. For intermittent use of POP3, this may not introduce a sizable risk. However, many POP3 client implementations connect to the POP3 server on a regular basis -- to check for new mail. Further the interval of session initiation may be on the order of five minutes. Hence, the risk of password capture is greatly enhanced. An alternate method of authentication is required which provides for both origin authentication and replay protection, but which does not involve sending a password in the clear over the network. The APOP command provides this functionality.	

Appendix C

2.   LOG DUMP

2.1 POWER ON

Just after the power of the machine is turned on, the NIC fax checks if there is any mail in the mailbox on the POP server.

```
                    [A]                                    [B]

#[system(intadm)] 99/10/22 19:34:44  RICOH NIC Ver. 1.2.8 (KAISER1)  NOTICE:
#[system(intadm)] 99/10/22 19:34:44  H3067220  Ver. 18  NOTICE:
#[snmpd   ] 99/10/22 19:34:46  Start snmpd Ver. 2.0   INFO:          [C]

         [D]


$[popd    ] 19:34:49  Connect to POP Server 133.139.157.30 ————— [1]
$[popd    ] 19:34:49  RCV: +OK os1g.ricoh.co.jp POP3 server (post.office v.1.9.3)
ready Fri, 22 Oct 1999 19:35:51 +0900 —————— [2]
$[popd    ] 19:34:49  XMT: USER nicfax ——— [3]
$[popd    ] 19:34:49  RCV: +OK Password required for nicfax. ——— [4]
$[popd    ] 19:34:49  XMT: PASS nicfax ——— [5]
$[popd    ] 19:34:49  RCV: +OK nicfax's maildrop has 0 message (0 octets) ——— [6]
$[popd    ] 19:34:49  XMT: STAT ——————— [7]
$[popd    ] 19:34:49  RCV: +OK 0 0 ——— [8]
$[popd    ] 19:34:49  XMT: QUIT ——————— [9]
$[popd    ] 19:34:49  RCV: +OK os1g.ricoh.co.jp POP3 server closing connection
```

[E]   H132X600.WMF

A: 'intadm' indicates internal NIC fax messages

B: The NIC fax software version

C: The FCU software version

D: Displays the POP connections

E: XMT means transmission, RCV means reception

1. The NIC fax requests connection to the POP server.

2. The response to the connection request is received.

3. The login name is sent out.

4. The request for a password is received.

5. The login password is sent

6. The confirmation of the login password is received, and a response that there is no mail is received.
    If the password is incorrect, the following command is received.
    $[popd   ] 19:34:49 RCV:-ERR Password failed for nicfax

7. The NIC fax requests the server to send the status of the mailbox on the server.

8. The server replies that there is no mail.

9. The NIC fax notifies that it is closing the connection.

2.2 MAIL TRANSMISION

Documents are scanned and stored in the memory. Then, the NIC fax connects to the SMTP server and sends the documents as a mail.

[A]

```
$[smtpd    ] 19:37:24  Connect to SMTP Server 133.139.157.30 ───────[1]
$[smtpd    ] 19:37:24  RCV: 220 os1g.ricoh.co.jp ESMTP server (post.office v1.9.3
ID# 0100110-37392) ready Fri, 22 Oct 19:38:26 +0900 ──────[2]
$[smtpd    ] 19:37:24  XMT: HELO kaiser1.ricoh.co.jp ───────[3]
$[smtpd    ] 19:37:24  RCV: 250 os1g.ricoh.co.jp ───────[4]
$[smtpd    ] 19:37:24  XMT: MAIL FROM:<nicfax@ricoh.co.jp> ───────[5]
$[smtpd    ] 19:37:24  RCV: 250 Sender <ncicfax@ricoh.co.jp> Ok ──────[6]
$[smtpd    ] 19:37:24  XMT: RCPT TO:<john@ricoh.co.jp> ───────[7]
$[smtpd    ] 19:37:24  RCV: 250 Recipient <john@ricoh.co.jp> Ok ──────[8]
$[smtpd    ] 19:37:24  XMT: RCPT TO:<nicfax@ricoh.co.jp> ───────[9]
$[smtpd    ] 19:37:24  RCV: 250 Recipient <nicfax@shinyoko.ricoh.co.jp> Ok ─[10]
$[smtpd    ] 19:37:24  XMT: DATA ───────[11]
$[smtpd    ] 19:37:24  RCV: 354 Ok Send data ending with <CRLF>.<CRLF> ──[12]
$[smtpd    ] 19:37:24  XMT:<DATA HEAD 32>
$[smtpd    ] 19:37:24  XMT:<DATA HEAD 27>
$[smtpd    ] 19:37:24  XMT:<DATA HEAD 17>
$[smtpd    ] 19:37:24  XMT:<DATA HEAD 62>                    [13]
$[smtpd    ] 19:37:24  XMT:<DATA HEAD 33>
$[smtpd    ] 19:37:24  XMT:<DATA HEAD 35>
$[smtpd    ] 19:37:24  XMT:<DATA HEAD 71>
$[smtpd    ] 19:37:24  XMT:<DATA CR/LF>
$[smtpd    ] 19:37:25  XMT:<DATA BOUNDARY>
$[smtpd    ] 19:37:25  XMT:<DATA PARTHEAD>
$[smtpd    ] 19:37:25  XMT:<DATA MIME 2798>
$[smtpd    ] 19:37:25  XMT:<DATA MIME 2804>
$[smtpd    ] 19:37:26  XMT:<DATA MIME 2804>
              :                                             [14]
              :
$[smtpd    ] 19:37:34  XMT:<DATA MIME 2800>
$[smtpd    ] 19:37:36  XMT:<DATA MIME 1380>
$[smtpd    ] 19:37:36  XMT:<DATA BOUNDARY-->
$[smtpd    ] 19:37:36  XMT:<DATA EOM>
$[smtpd    ] 19:37:36  RCV: 250 Message received: ───────[15]
19991022023039136.AAA99@kaiser1.ricoh.co.jp
$[smtpd    ] 19:37:36  XMT: QUIT ───────[16]
$[smtpd    ] 19:37:36  RCV: 221 os1g.ricoh.co.jp ESMTP server closing connection ─[17]
```

H132X601.WMF

A: Displays the SMTP connections.

APPENDIX C-9

1. The NIC fax requests connection to the SMTP server

2. The response to the connection request is received.

3. A transmission channel is opened and the domain name is sent.

4. The response containing the server domain name is received.

5. The NIC fax sends its own mail address, then notifies that it is opening the mail transmission.

6. The response is received.

7. The NIC fax sends the receiver address.

8. The response is received.

9. The NIC fax sends the next receiver address.

10. The response is received.

11. The NIC fax notifies that it is starting to transfer the mail data.

12. The request to transfer data is received.

13. The NIC fax sends the mail header.

14. The NIC fax sends the MIME data (FAX.TIF file).

15. The response and the ID number of mail are received.

16. The NIC fax notifies that it is closing the connection.

17. The response is received.

2.3 MAIL RECEPTION

The NIC fax connects to the POP server and checks the mailbox, then receives the stored two mails.

```
$[popd    ] 19:44:49  Connect to POP Server 133.139.157.30
$[popd    ] 19:44:50  RCV: +OK os1g.ricoh.co.jp POP3 server (post.office v.1.9.3)
ready Fri, 22 Oct 1999 19:44:52 +0900                                    [1]
$[popd    ] 19:44:50  XMT: USER nicfax
$[popd    ] 19:44:50  RCV: +OK Password required for nicfax.
$[popd    ] 19:44:50  XMT: PASS nicfax
$[popd    ] 19:44:50  RCV: +OK nicfax's maildrop has 2 messages (35431 octets).  [2]
$[popd    ] 19:44:50  XMT: STAT                                      [3]
$[popd    ] 19:44:50  RCV: +OK 2 35431                                  [4]
$[popd    ] 19:44:50  XMT: TOP 2 0                                   [5]
$[popd    ] 19:44:50  RCV: +OK Top 0 lines of message 2                 [6]
$[popd    ] 19:44:51  RCV:<TOP DATA EOM>                             [7]
$[popd    ] 19:44:51  XMT: TOP 1 0                                       [8]
$[popd    ] 19:44:51  RCV: +OK Top 0 lines of message 1            [9]
$[popd    ] 19:44:51  RCV:<TOP DATA EOM>                               [10]
$[popd    ] 19:44:51  XMT: RETR 1                                 [11]
$[popd    ] 19:44:51  RCV: +OK 17689 octets
$[popd    ] 19:44:51  RCV:<DATA 1442>
$[popd    ] 19:44:51  RCV:<DATA 1460>
             :                                            [12]
             :
$[popd    ] 19:44:53  RCV:<DATA 1163>
$[popd    ] 19:44:53  RCV:<EOM>
$[popd    ] 19:45:02  XMT: DELE 1                          [13]
$[popd    ] 19:45:02  RCV: +OK Message 1 has been deleted.      [14]
$[popd    ] 19:45:02  XMT: RETR 2
$[popd    ] 19:45:02  RCV: +OK 17742 octets
$[popd    ] 19:45:02  RCV:<DATA 1442>
             :                                            [15]
             :
$[popd    ] 19:45:04  RCV:<DATA 1203>
$[popd    ] 19:45:04  RCV:<EOM>
$[popd    ] 19:45:04  XMT: DELE 2                            [16]
$[popd    ] 19:45:04  RCV: +OK Message 2 has been deleted.
$[popd    ] 19:45:04  XMT: QUIT                           [17]
$[popd    ] 19:45:04  RCV: +OK os1g.ricoh.co.jp POP3 server closing connection
```

H132X602.WMF

1. The procedures of the logging into the POP server.

2. The POP server replies that there are two mails.

3. The NIC fax requests the server to confirm the status of the mailbox on the server.
   NOTE: After the PASS command, the POP server does not always give information about mailbox status (see note 2 above), so the NIC fax asks again here.

4. The response is that there are two mails in the POP server.

5. The NIC fax requests the server to send the message header of message no.2.

6. The response is received.

Appendix C

7. The message header of message no.2 is received.

8. The NIC fax requests the server to send the message header of message no.1.

9. The response is received.

10. The message header of message no.1 is received.

11. The NIC fax requests the server to send the attached file.

12. The data is received.

13. The NIC fax requests the server to delete message no.1.

14. The response is received.

15. The procedures for receiving message no.2.

16. The procedures for deleting message no.2.

17. The NIC fax notifies that it is closing the connection.