# Fax Management
with RelayFax

Contents

Abstract

The fax server puts a digital spin on an old trustworthy analog technology. It sends and receives facsimile transmissions to and from personal computers on a local area network, wide area network or the Internet. It allows users to share fax machines or fax modems or both if they are accessible through the network. RelayFax integrates fax sending and receiving through almost any email server, including Alt-N's MDaemon email server. Through the RelayFax, authorized email users can send regular email attachments to a mailbox and have them forwarded as industry-standard facsimiles to any fax devices in the world. RelayFax uses client-server technology, with the server running on a network hardware platform and the clients operating on desktop or lap computers.

A long time ago, when the telegraph was invented…

19th Century Beginnings

If you search the Internet for the history of the fax, you will find several sites claiming the facsimile was born about the same time as email, early 1970-ish. Some even add 10 more years, naming 1980 or so as the birth year of faxing. While the fax ramped up into common usage during the last three decades of the 20th Century, it is actually a greybeard in terms of modern electronic equipment. The parent technology of the fax as it exists today came into being at the hands of a Scot clockmaker named Alexander Bain. Mr. Bain received his patent for a facsimile device in '43, 1843, 33 years before the patenting of the telephone and more than 150 years prior to the dawn of the 21st Century, with all of its technological promise.
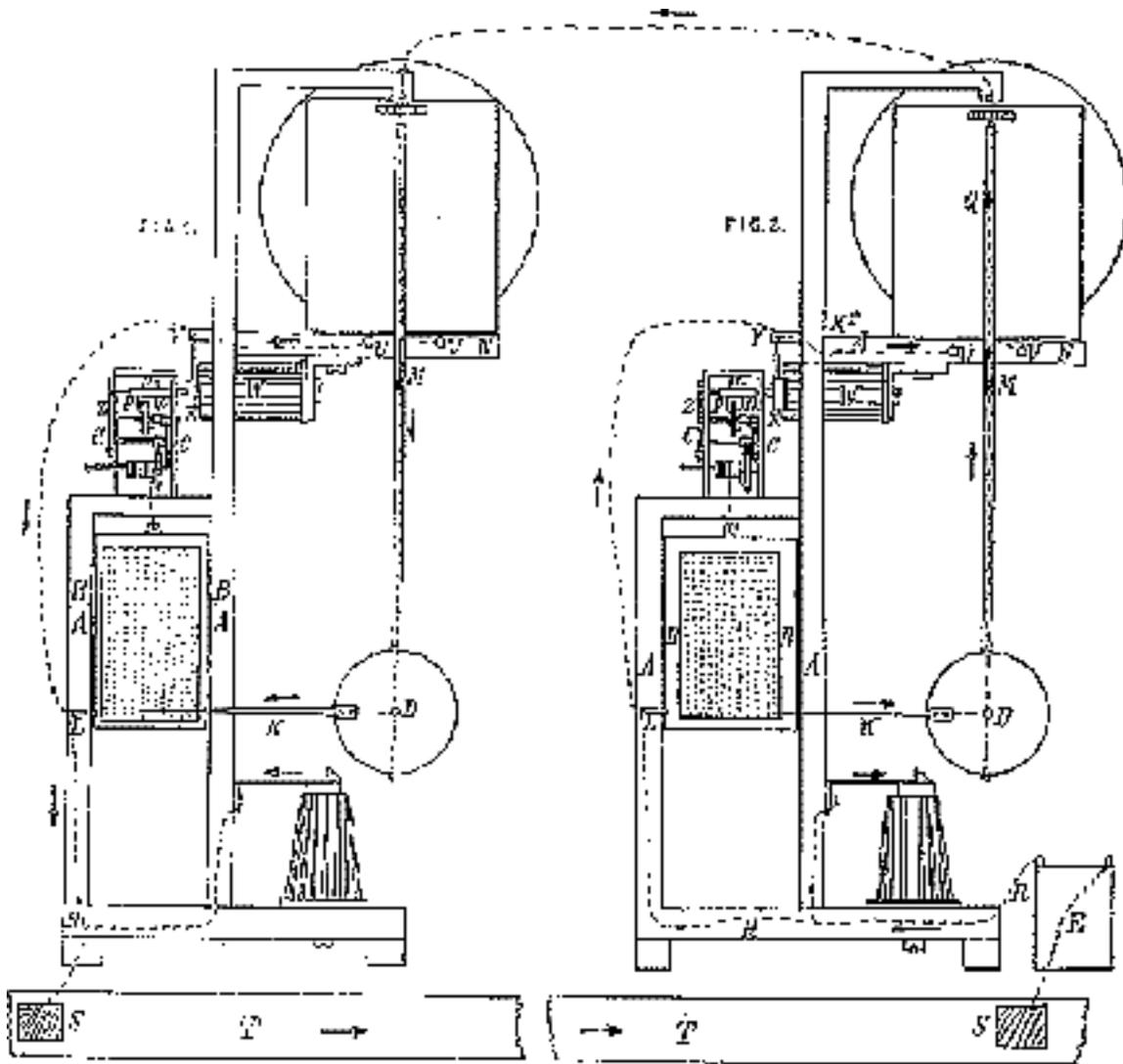
Mr. Bain's invention, the facsimile machine, was designed to send images and text using the facilities of the then recently invented telegraph. It required two identical machines, one to send, the other to receive. The illustration shows two 1843 fax machines working synchronized together. The electric signals follow the arrows.

As with modern faxes, the machine sending the facsimile scanned the original image point-by-point and line-by-line. It sent different strengths of electric signals for dark and light points as it scanned. The signals traveled at more or less the speed of light along telegraph wires. The receiver plotted dark and light points depending on signal strength. The facsimile image appeared similar to the original. After Mr. Bain's initial work, the invention received some enhancements by its creator and others, but pretty much sat unused for the next 20 years.

Early Applications

The first commercial long distance use of the fax spanned the 70 miles between the French cities of Paris and Amiens. This happened in early 1860-something, the exact year being up for debate. Everyone does agree the event employed machines built on Mr. Bain's principles and refined by the Italian Abbe Giovanni Caselli. They used telegraph wire. Mr. Caselli added service to other cities and in one year transmitted 5,000 documents between Paris and the distant sites. The telephone was still more than 10 years from being patented.

Other inventors added enhancements. Picture transmission caught on with the media. Near the turn of the 20th Century, newspapers began to send and receive pictures using facsimile equipment. The machines were complex, delicate and expensive. They used dedicated point-to-point wires or radio links. By the 1920's, newspapers commonly used these devices to send pictures between cities, countries and continents. The illustration shows a picture of a transmission machine in use shortly after 1900.
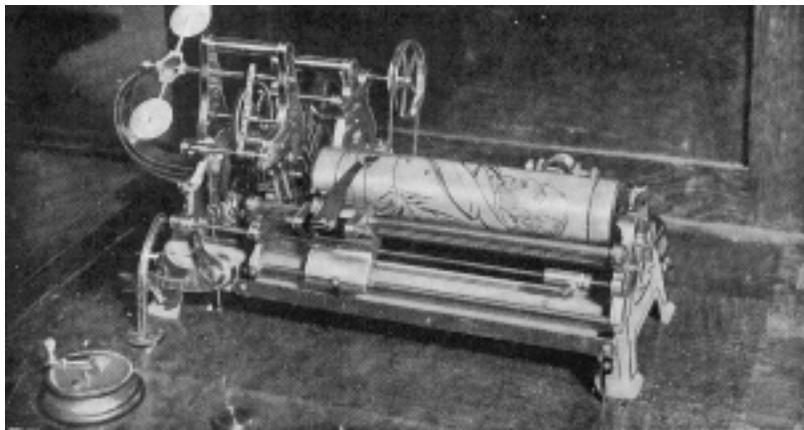

Still more refinements improved facsimile transmissions. By the early 1970's, when email really did spring from an inventor's mind, smaller and more affordable fax machines began to show up in some businesses. The carrier for the fax signals migrated from the telegraph to the public telephone network. Connections were still point-to-point, but now through the local exchange and long distance telecommunications switches.

As the sizes and prices of fax equipment fell during the succeeding 20 years, millions of large and small enterprises began sending and receiving faxes, often installing a telephone line dedicated to nothing but a fax machine. Everyone started to fax images and text for business and pleasure. In fact, some of the best classic jokes of all time traversed the world via facsimile before most people had heard of the Internet. Yet, the basic work of the fax is more practical than that.

Image Quality and Fax Modems

Copies of 19th Century facsimiles are difficult if not impossible to obtain. Yet, one thing is certain: while the quality was great 150 years ago when all was new, it would never due for current business or personal use.

Even today, faxing a printed page from one location to another often results in fuzzy images and spotty text. This is because scanning the original, transmitting it and recreating it on the other end, always causes some drop in quality. Scanning resolution, transmission line quality and the rendering ability of the receiving machine all effect how the facsimile fares. The illustration shows a piece of a fax with low-quality text results.
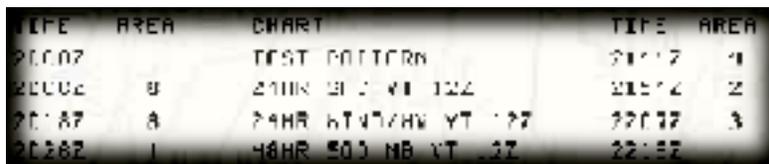
Improvements in technology and changes in industry standards have aided the quality, but the tools available on personal computers have supplied the biggest image boosts.

Fax modems and free supporting software come standard with most modern computers. These tools permit a user to send and receive a fax directly from a computer application. Most of these products integrate with the computer Print command to convert a document into a faxable format. The fax modem software simulates scanning. Because the software works directly with the computer document, not through a mechanical optical scanning device, there is no loss of image resolution. Depending on the quality of the receiving fax, the results can look as good as direct output on a local printer.

Fax Applications

Email Killed the Fax, Right?

"The fax is dead! Long live email!"

The e-Town Crier belted out this message for about five seconds sometime during the closing years of the 20th Century. Then someone handed him a page. Printed on plain white business paper, it was marked with a time stamp and the phone number of the sending fax machine.

"Oops."

The embarrassed bellower had plenty of company, though. Since its invention by Ray Tomlinson[1] in 1971, email has steadily improved in reliability, flexibility, speed, ubiquity and ease of use. It has metamorphosed from the domain of the government/education/business consortium, through personal modem access by Fidonet[2], to the dialup and direct connection service providers on the Internet.

Sending messages person-to-person requires only typing the text, entering the email address and using the *send* command. Broadcasting a message to multiple users means merely adding more addresses to the email. The ability to attach files to email empowers users to exchange documents, spreadsheets, pictures and computer programs at network speeds.

Email is wonderful. So who needs a fax?

Faxing Meets Some Unique Needs

Fax marketing literature is filled with some viable as well as some, ah, well, very interesting reasons to keep on faxing. One of the least convincing arguments goes something like this: "An email is easy to delete, a fax is difficult to ignore." This proverb appears to assume the receiver is hoping to avoid a message. If the communiqué arrives by email, pressing *delete* puts it out of sight and out of mind. Meanwhile, the insuperable fax sits boldly on the machine as a daily reminder of things undone. Hum? Perhaps a contrasting proverb might be this: "The finger that presses *delete* belongs to the hand that crumples the page."

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[1] Mr. Tomlinson was helping the United States Defense Department build ARPANET, the ancestor of the Internet. He is also the person who chose the @ symbol to separate the name of the email account and the machine hosting the email account. The @ symbols shows where the account is "at".

[2] FidoNet consists of approximately 30,000 dialup systems world-wide making up a network for exchanging email and files with the Internet. Fidonet on the web: http://fidonet.fidonet.org/

Putting commentaries aside, businesses, government, non-profit organizations and individuals prefer the fax in some cases for many understandable reasons. Presented in more or less random order these reasons include:

Faxing pages from printed materials is easier and quicker than scanning and emailing them. For large documents, the fax itself may take longer to send than an equivalent email, but the sender is concerned about preparation time, not transmission time.

Printing is complete when the fax arrives. Sure, you can print an email, but the fax is already printed for you. Printed documents appeal to many people who prefer to read things they can touch and easily transport. While notebook computers with email are definitely portable, they do not offer the compact convenience of the printed page. A printed document is easier to read on a commuter train or while waiting for your lunch to arrive, as examples.
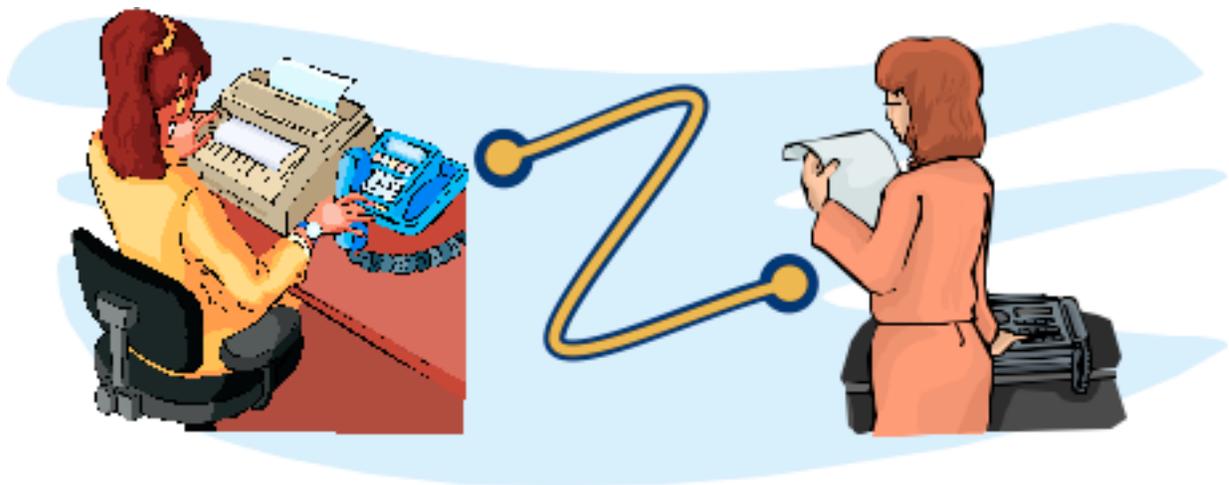
Faxes are more formal than email. A fax can contain a letterhead or logo. While HTML-formatted email can do the same thing, it also slows down the email client and requires a live connection to a network to retrieve any graphics. Plus, HTML email opens the potential for security attacks using imbedded scripts.

Faxes are more casual than email. You can hand write a note (use black ink on white paper) and fax it to someone. With email you could hand write the note, scan it in, then send it as an email attachment, couldn't you?

Email attachments from the most popular word processing, spread sheet and presentation programs can and often do contain viruses, without the creator's permission or knowledge. Of course you can use virus protection software, but a fax arrives virus free.

Signatures on a fax are legal. Therefore faxed contracts are legal. This is coming to email, but the arrival is slow.

Faxing is secure. While snooping a fax line is possible with wiretap equipment, any knowledgeable kid with an Internet connection can watch email go drifting by. Email can be made more secure with encryption technology, but almost no one uses it, because, it's inconvenient.

Although the fax was originally meant for brief communications, modern faxes handle multiple pages just fine. Some attorneys use the fax to send pre-trail motions to a judge, for example.

A fax confirms its arrival. If it does not arrive it often tells you the reason, such as out of paper or paper jam. While email reliability is very high, you never know for sure if a mail arrived until you hear back from the receiver. There is always plausible deniability with email.

The fax is fast. Email is fast too. Sometimes the fax is faster, at other times email wins. The speed depends on the availability of a connection and the size of the document.

A fax transmission creates a paper trail on both ends. Email filtering can sort and save messages for record keeping, but a physical paper trail is often part of company policies and procedures.

The fax is familiar and personal. People make Sergeant Friday jokes about it, saying, "Just the fax, please, ma'am." Email can be viewed as a nuisance, a source of junk mail and a carrier of viruses.

Faxes are universal. Millions of people have no email, but almost everyone has a place to receive a fax. Going to an Internet café is not the same as picking up a fax from the local office supply. The cost is high and the technology can be confusing.

Computer generated faxes have the convenience of using of a word processor or spreadsheet application, for example, added to all of the other advantages of the fax.
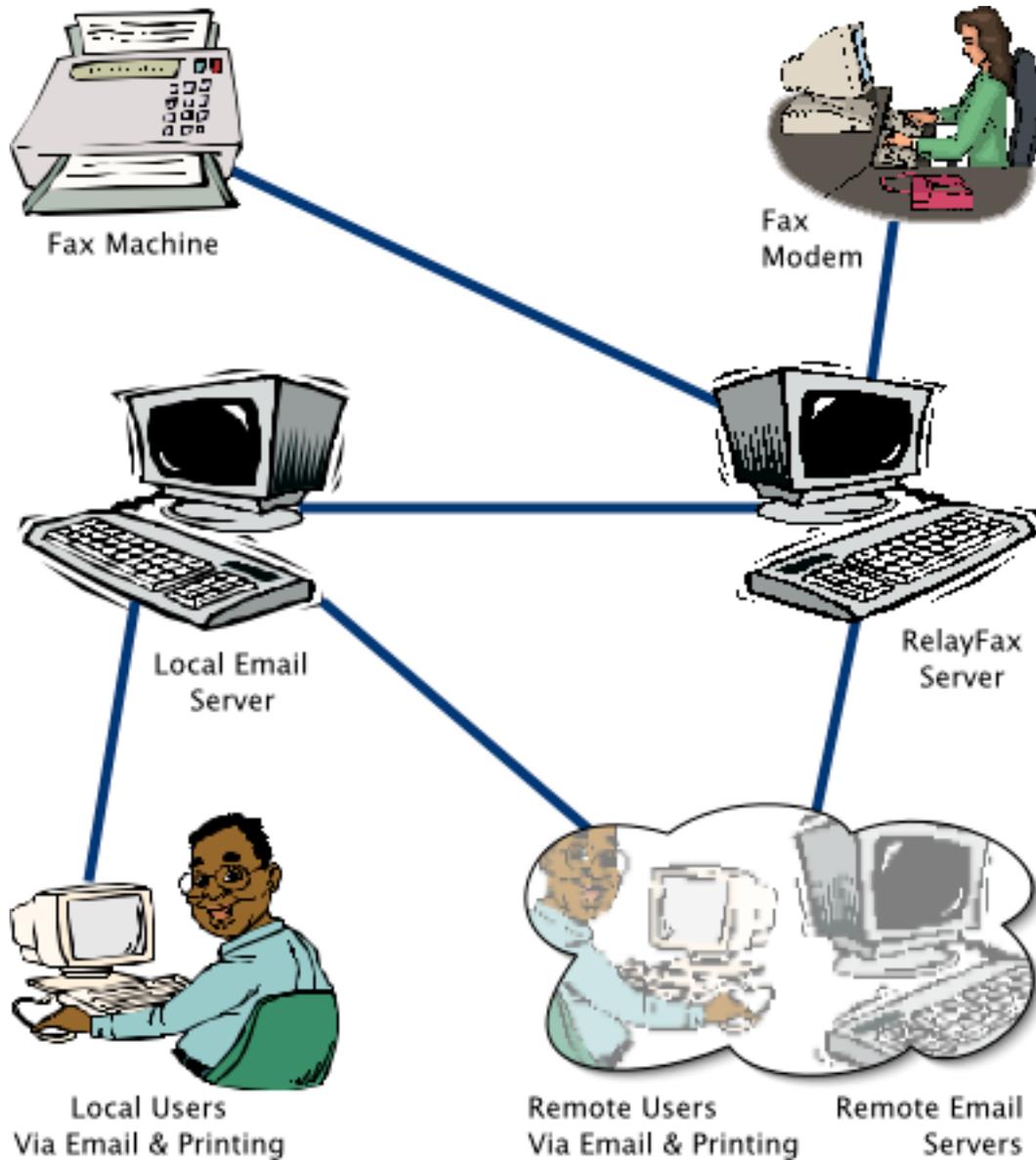
RelayFax

Blurring the Lines

RelayFax blurs the lines separating facsimile and computer technologies. This fax server software enables Information technology departments and service providers to integrate faxing into their digital networks.

The illustration represents how RelayFax works at the block diagram level.

Creating Faxes

In the illustration, local and remote users send faxable documents to an email server. The email server can be on the same network as RelayFax or on a remote network or both. The illustration shows local and remote email servers.

Users have four ways of sending documents to an email server.

Email Message

Create an email and send it to a RelayFax account, such as fax@faxmail.net.
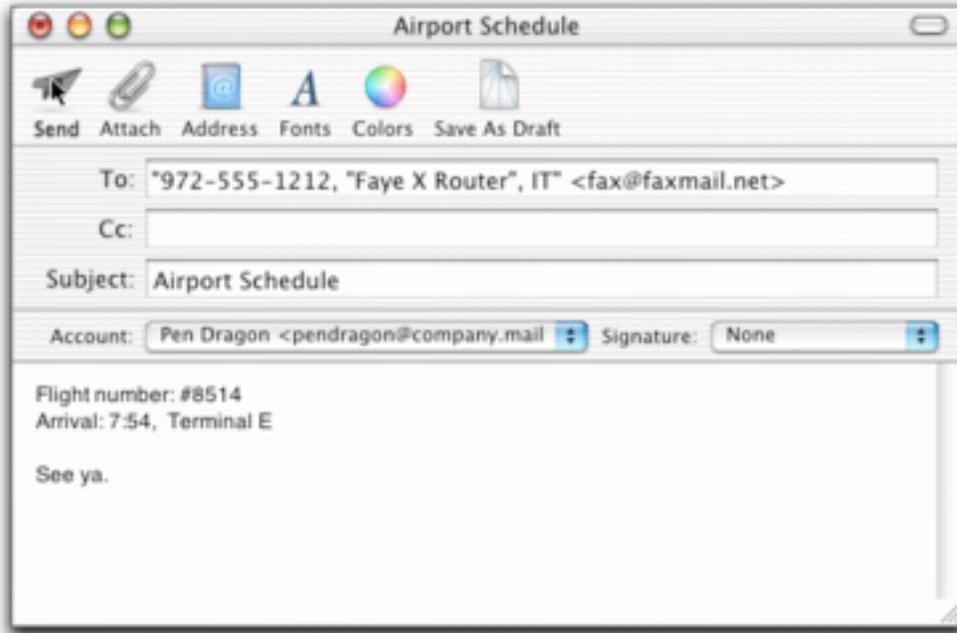
Email Attachment

Add an attachment to an email and send it to a RelayFax account.
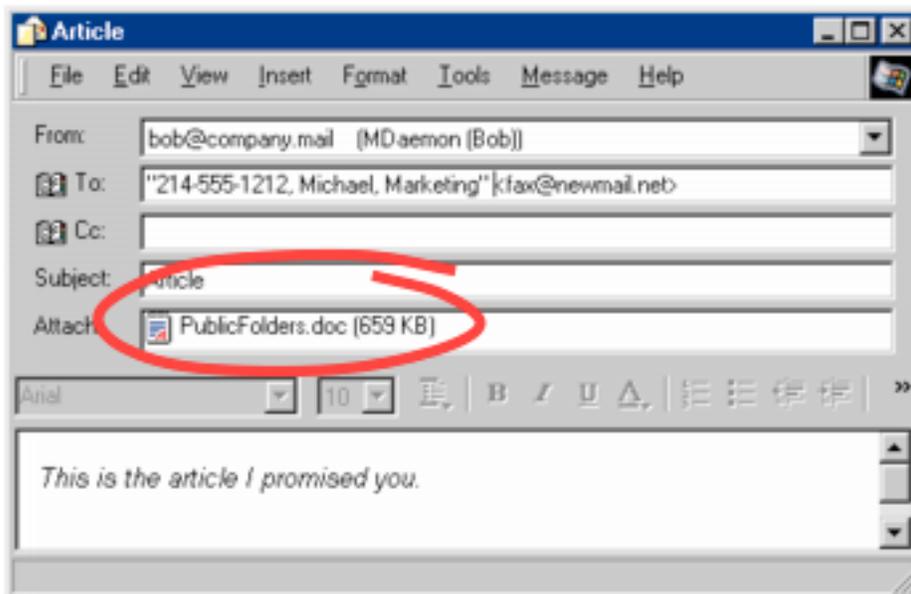
RelayFax Client Message or Scan

Open the RelayFax Client on a computer, enter a message and send it. This sends an email to a RelayFax account. The client software provides for scanning in a page and sending it.
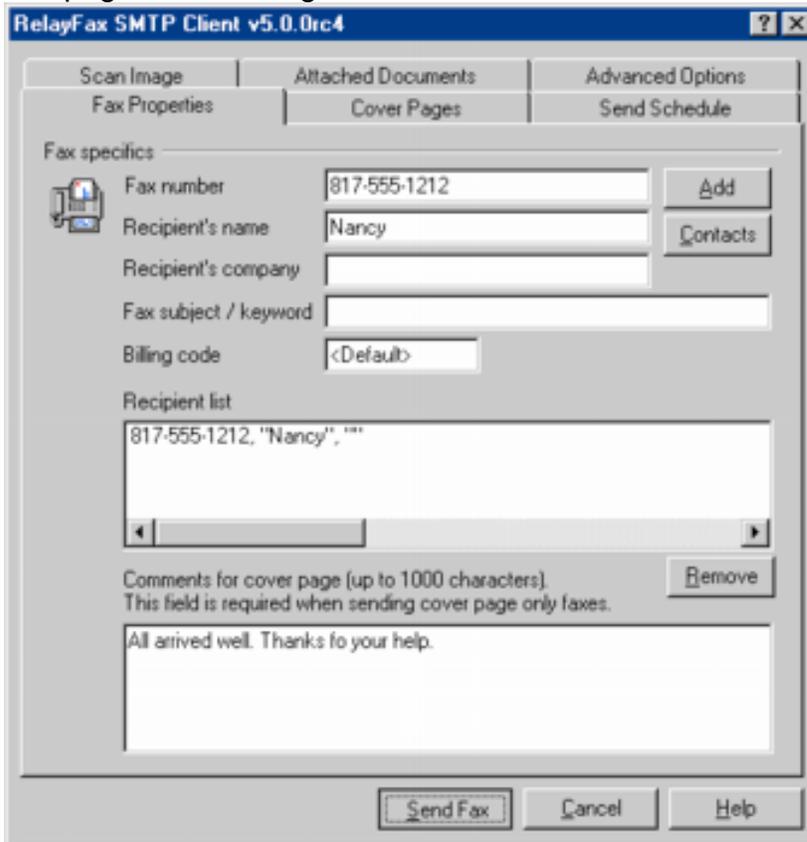
Print to Fax

Print a document from any application using the RelayFax Printer Driver. This emails a faxable copy of the document to a RelayFax account.

Relaying Faxes

RelayFax can access faxable content from multiple email accounts on multiple email servers. The email accounts receiving the faxable documents must allow Post Office Protocol (POP) access. Periodically, RelayFax retrieves the email and sends the faxes, doing some conversions along the way:

For text only emails, the fax server converts the text to a faxable format.

For email attachments, RelayFax opens each document using its creator application (or a compatible program) and converts it to a fax.

Output from the RelayFax client and printer driver are ready to fax when they reach the email account.

RelayFax sends the faxes to the receiver by dialing up a fax machine, calling a fax modem or sending the fax as an email attachment. It can access faxes from multiple accounts on multiple email servers.

Receiving Faxes

RelayFax can also receive and route transmittals from outside fax machines or fax modems. When it receives an outside fax, RelayFax can route it using port mapping or destination extraction. Port mapping routes all faxes from a specified incoming port to a specified destination. Destination extraction uses optical character recognition (OCR) technology to attempt to route a fax correctly. OCR can look for names, phrases or IDs, as examples, to use in routing a fax. OCR typically works well for computer generated faxes and clean scanned typeset transmittals. It works sometimes for fuzzy typeset faxes and not at all for handwritten text.

Using the extracted destination information, RelayFax searches its accounts for a match. It then attaches the fax to an email and sends it to the recipient. If RelayFax cannot reconcile an incoming fax to a destination for any reason, it can send the fax to a general delivery account.

Users have a Fax Viewer application for viewing and printing the faxes.

More OCR-ing

RelayFax can also use OCR technology on an entire incoming fax. As with destination extraction, OCR works only with clear and clean typeset text. The OCR tools attempt to convert the fax to text and then send it to its destination.

Emailing Concepts

Using email allows multiple users to send faxes from their computer desktops. Users send and receive with their familiar desktop application programs and the easy-to-use RelayFax Client.

In some cases, a user might send a fax from one email account to another email account, totally bypassing a fax machine or fax modem. This might happen when the user has a broadcast list containing some recipients with fax machines and others using RelayFax accounts, for example. If the users with RelayFax accounts receive their faxes by email, those faxes would never go through a physical fax machine. But all recipients would receive the same content.

RelayFax Features

While RelayFax has a simple design, it contains many options for configuring:

Email sources

User accounts

Attachment processing

Fax image delivery formatting

OCR processing

Processing schedules

Fax and coversheet templates

Routing rules for outbound, inbound and junk faxes

Billing Codes

RelayFax Client

Fax Viewer

By understanding the options, a system administrator can create a flexible, nearly invisible facility for handling almost all faxes for almost any business, organization or service provider.

Documentation for these features resides in the *RelayFax User Manual*.

The following descriptions highlight some configuration features and functions.

Email Sources

RelayFax can use multiple email accounts on multiple email servers. The accounts must have POP access. The server name, plus the account name and password is all RelayFax needs to retrieve faxable documents.

The illustration shows the *Mail Sources* tab of the **Mail Sources and Rules** dialog.
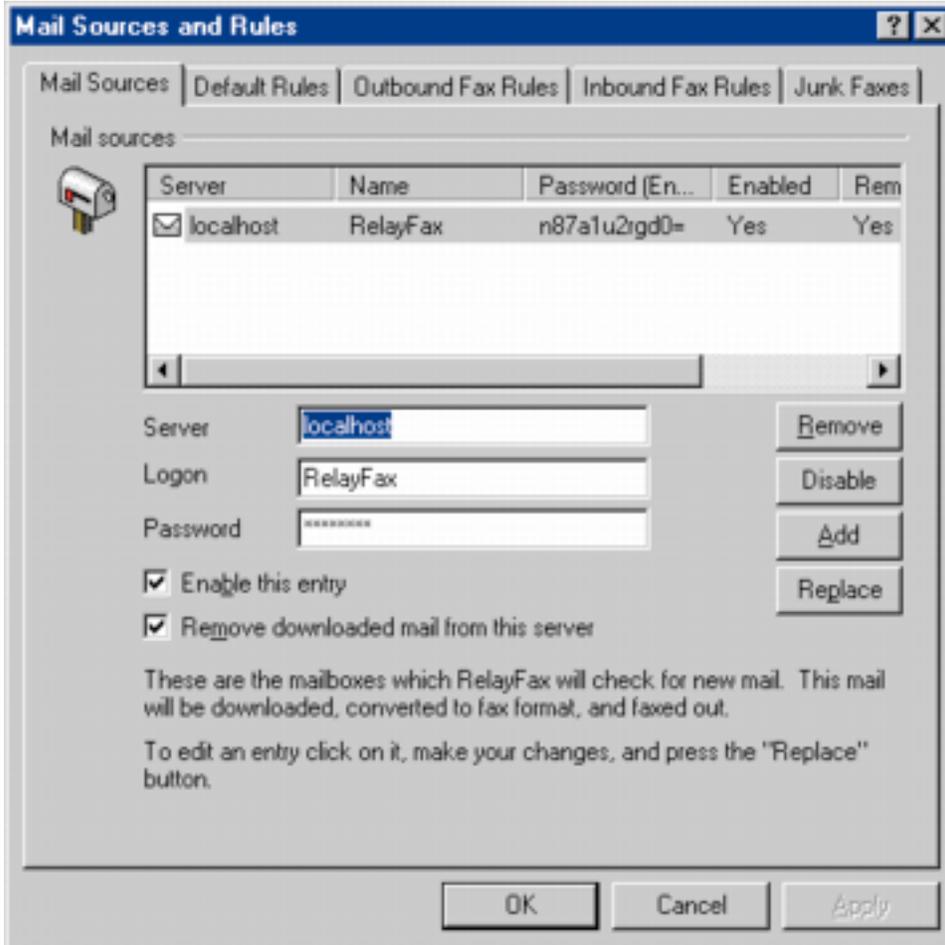
User Accounts

Each user must have an individual account to access RelayFax. Users must also have corresponding accounts on one of the email servers RelayFax uses. The system administrator can enter account information manually or import it if the email server is MDaemon 3 thru 6.

The illustration shows one tab of the **Account Settings** dialog. Account information consists of the name, email address and password. Options provide for automatic account creation. The *Options/Password* tab includes security settings.
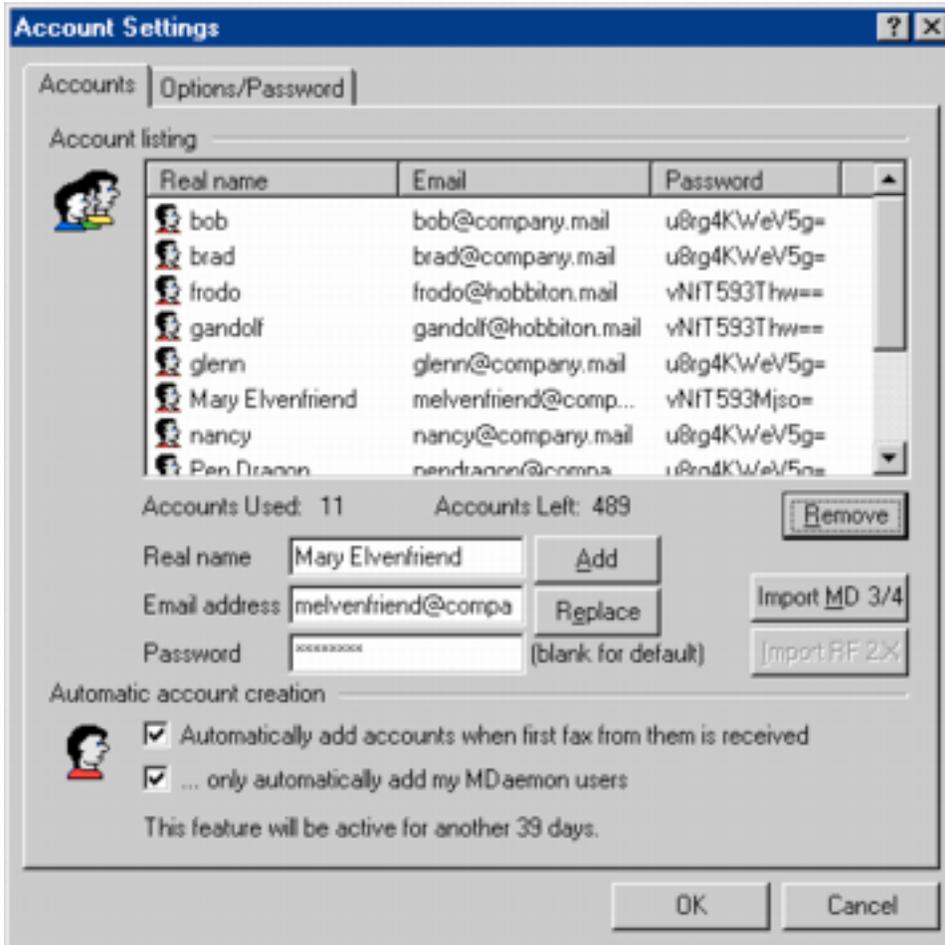
Attachment Processing

When a user sends RelayFax an email attachment, the fax server can convert the document to a faxable format. It does this by opening the document with its creator application, based on the file extension, such as .bmp or .doc. The illustration shows the *Attachment Faxing* tab of the **Attachments, Exporting, Imaging and OCR** dialog. Each file extension must have an entry in the Windows Registry. An entry associates a file extension with a creator application.
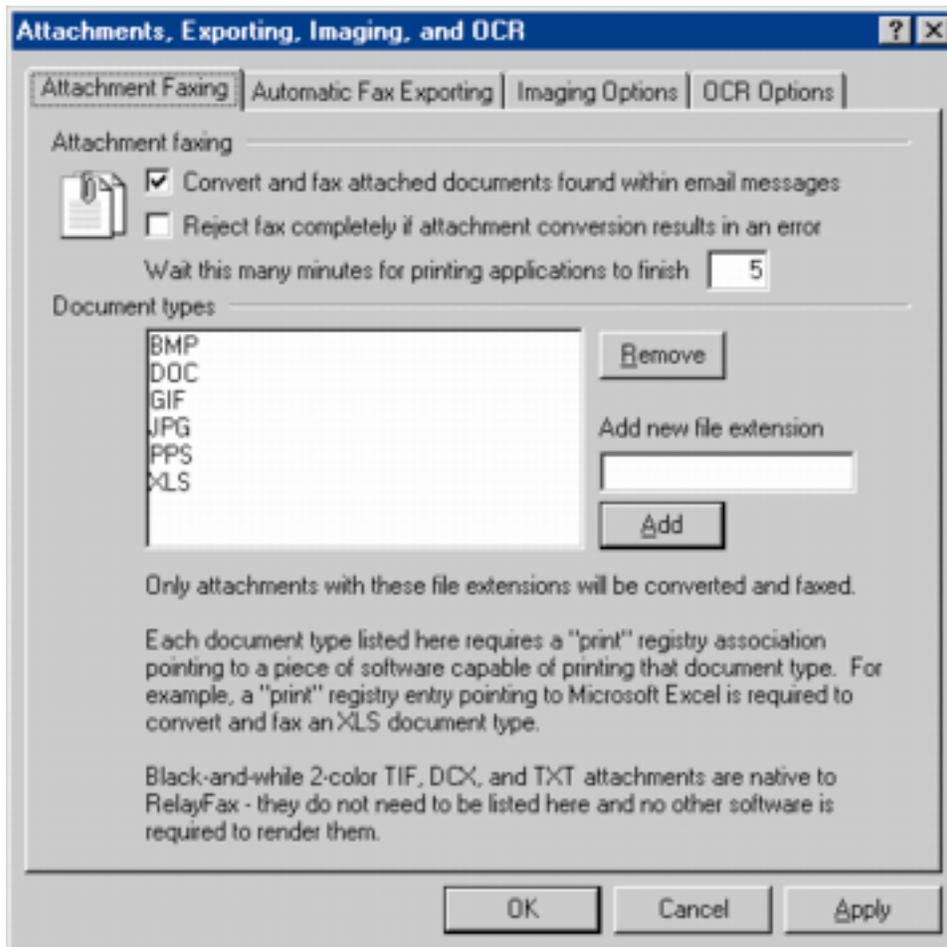
Incoming Delivery Formats

The administrator can set the delivery format for incoming faxes. The default format is a multiple page tiff document. Other options include one file for each page using the tiff, jpg, gif or bmp formats. The illustration shows the *Imaging Options* tab of the **Attachments, Exporting, Imaging and OCR** dialog.
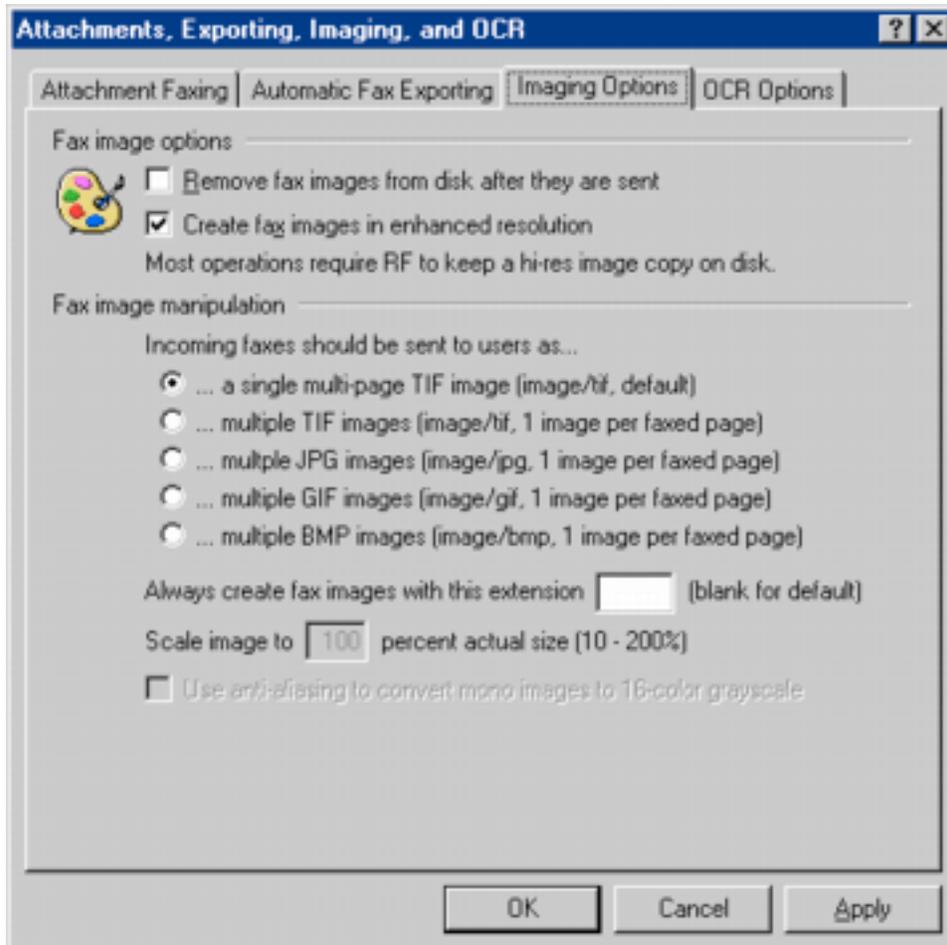
OCR Processing

OCR processing extracts destination information from inbound faxes. It requires a downloadable plug-in for RelayFax. OCR options include how to handle known and unknown addresses. The illustration shows the *OCR Options* tab of the **Attachments, Exporting, Imaging and OCR** dialog.

Processing Schedules

RelayFax processes email according to schedules set up by the system admin. The **Event Scheduler** dialog contains options for setting the hours, minutes and days to do processing. The illustration shows the *Event Scheduler* tab on the dialog.
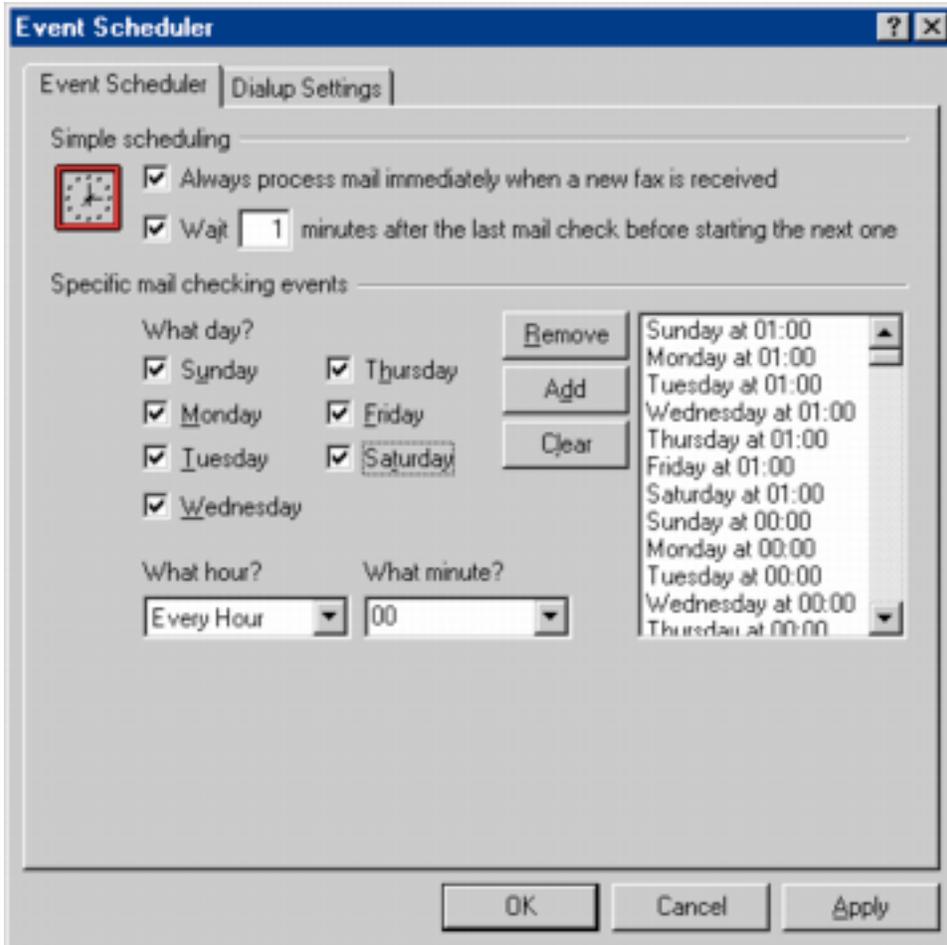
Dialup Settings

Dialup settings enable RelayFax to receive and send mail to dial up email servers. The illustration shows the *Dialup Settings* tab on the **Event Scheduler** dialog. Dialup uses RAS profiles.
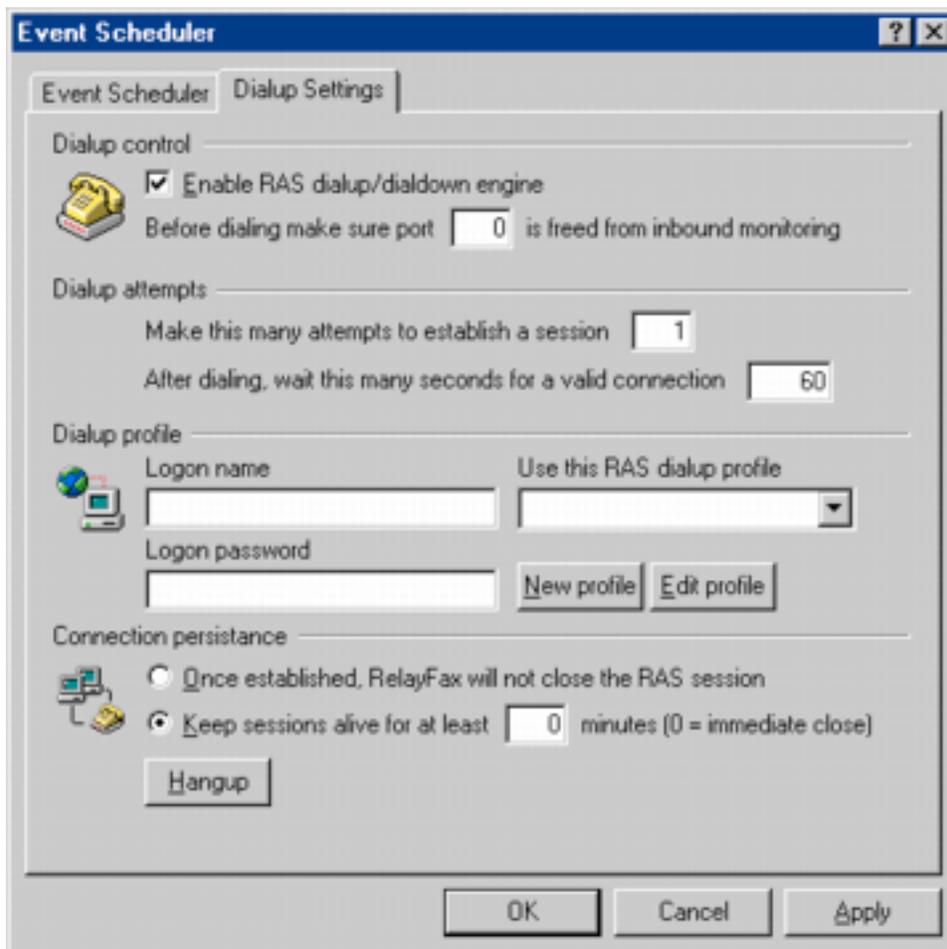
Fax And Coversheet Templates

Templates for faxes and coversheets make the user's job easier and provide for a consistent appearance for an enterprise or department. RelayFax has many options for setting up custom templates. The illustration shows one tab from the templates fax templates dialog. Options for a template include name and description, content of the banner on each page and faxing settings.

**Routing Rules for Outbound, Inbound and Junk Faxes**

Routing rules allow RelayFax to format and route faxes based on their source, destination and content. The rules can be applied to inbound, outbound and junk faxes.

An inbound rule might route a fax to a specific group of users if the incoming fax came from an identifiable phone number or company, for example.

Another rule could apply a billing code to an inbound fax, based on its source or destination.

Rules can be simple or complex, containing one instruction or multiple-instructions.

The illustration shows an simple outbound fax rule. For complex rules, the instructions are processed in sequence. Knowing some processing logic is helpful but not necessary for successful set up of rules.
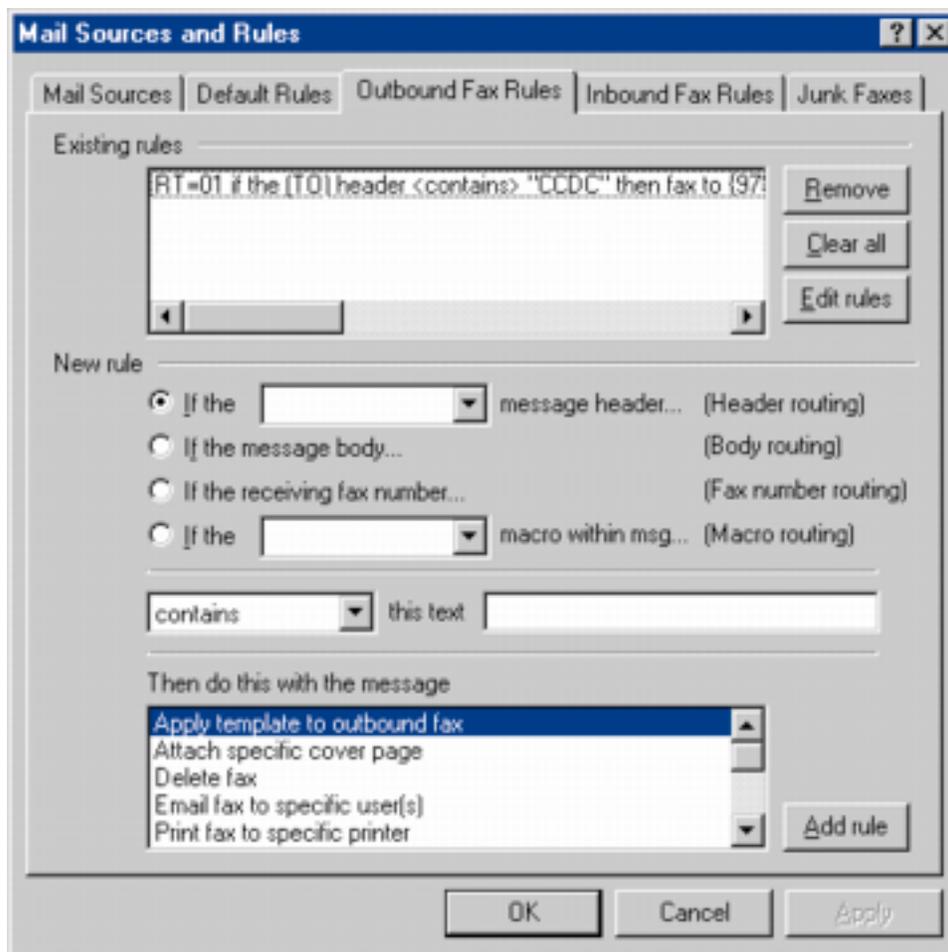
Billing Codes

Billing Codes can help an enterprise or service provider charge users for fax services. Here is the dialog for setting up billing codes. Options include forcing the use of billing codes and setting up the codes.
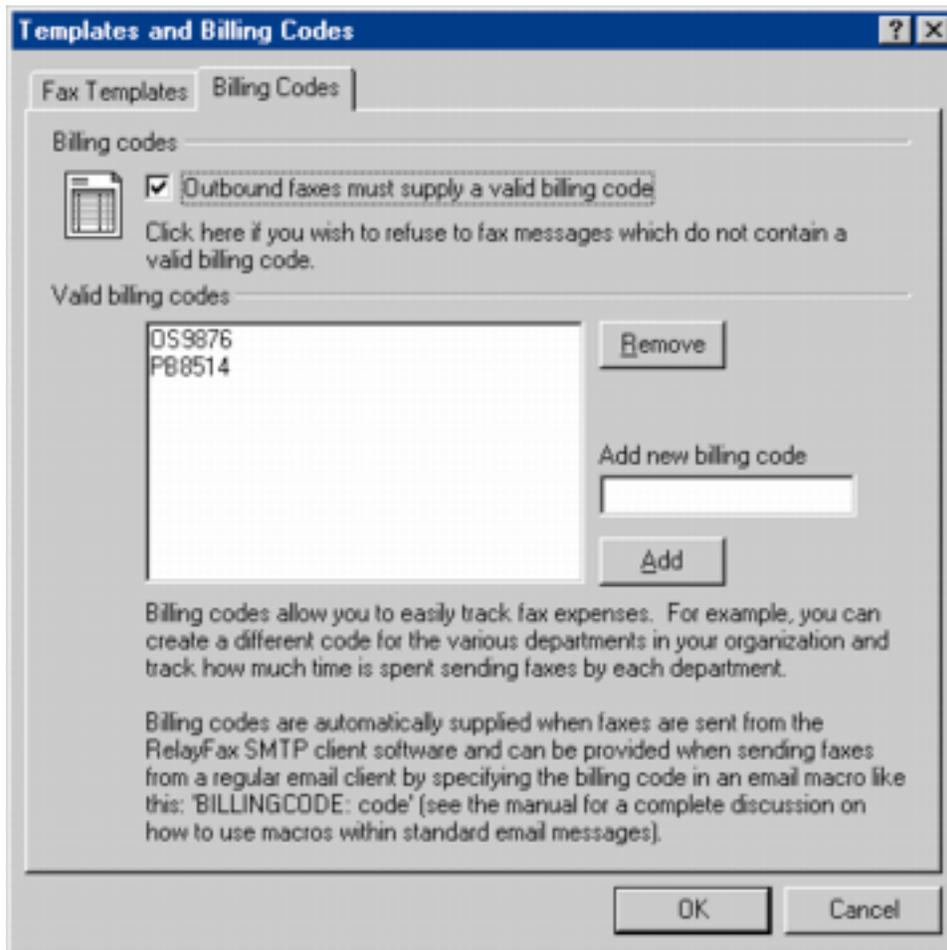
RelayFax Client

The RelayFax Client is software residing on a user's personal computer. It provides for sending faxes from the desktop. Options include setting up the sender and destination, specifying a cover page, attaching documents and entering a transmission time for the fax. The illustration shows a sample tab from the Client dialog.
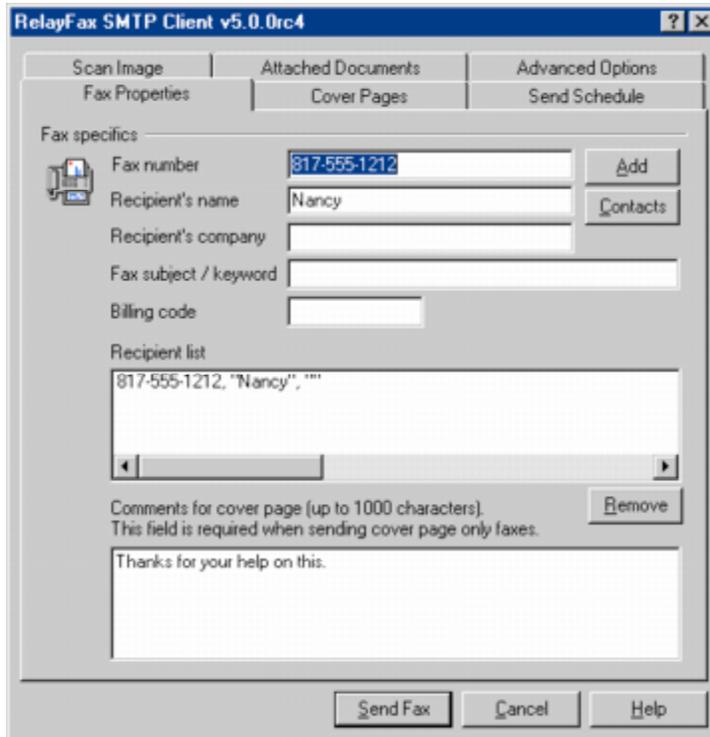
Fax Viewer

Fax Viewer comes with the RelayFax client. It opens faxes converted to tiffs

Conclusion

Its unique features and familiar "look and feel" have kept faxing popular and growing even in the age of email. Integrating fax processing into a digital network provides desktop management for this trusted technology. It allows users to send and receive faxes with their regular software applications. RelayFax can employ any email POP-enabled email server to extend the reach of the server into the Internet. RelayFax users can process faxes from wherever they have LAN, WAN or Internet access.