

ListSTAR/SMTP Technical Reference

This technical reference describes the ListSTAR Server and its interaction with AppleScripts. To jump to a topic, click on it here:

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For information about setting up services, see the [Getting Started](#) guide.

For the latest information about ListSTAR and additional AppleScripts, see our Web server:

<http://www.starnine.com/>

Use these procedures to navigate this reference:



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ListSTAR/SMTP Folder

The ListSTAR/SMTP folder contains these items:

- ADMIN folder

The ADMIN folder contains resource files, administrative files such as the log and Transaction Log, and the main Prefs file that contains overall configuration information such as what services are configured and how they are configured (account name, password, login times, and so forth for each service). It also contains other administrative applications and documents. The ADMIN folder contains two subfolders: Address Lists and User Lists. These will contain the physical files that represent user addresses created within the ListSTAR Server interface.

▲ **Important:** We strongly recommend that you do not rename or remove the files in the Address Lists or User Lists folder. Instead, use the Address Lists command in the Windows menu of the ListSTAR Server.

- AppleScripts folder

The AppleScripts folder contains sample AppleScripts. These AppleScripts require the “scriptable Finder”—this means you need either System 7.5 (or later) with AppleScript support, or the “Scriptable Finder” add-on package installed on earlier System 7 releases. Also, version 1.1 (or later) of AppleScript is required.

- ListSTAR Server application

- Message Spool/SMTP folder

Inbound and outbound messages are stored in this folder. The messages are transmitted and received when the ListSTAR Server is contacted by a mail host on the TCP/IP network.

An overflow condition can occur when more than 100 messages are stored in the spool folder. An overflow condition is a decrease in server performance caused by repeated slow GetFileList operations on the spool folder. Overflow conditions occur occasionally and are normally resolved by the ListSTAR Server, but if they occur frequently you should contact StarNine Technical Support for assistance.

- Services folder

When you create a service, a folder with the same name as the service is created in the Services folder. Unless you did a custom install and chose not to install the example services, this folder will initially contain four subfolders, one for each service.

The folder for each service must at least contain a Prefs file. The Prefs file within that folder will contain all of the rules for that service.

▲ **Important:** We strongly recommend that you back up all Prefs files after you have configured a service.

In addition to the Prefs file, the folder for each service will typically contain folders for file enclosures, filed messages, and service-specific AppleScripts. We recommend that you create these service-specific folders within the service’s folder. This is not required, but it makes it easier to keep track of the files.

ListSTAR Server Menus

The ListSTAR Server menus are shown in FIGURE 1.

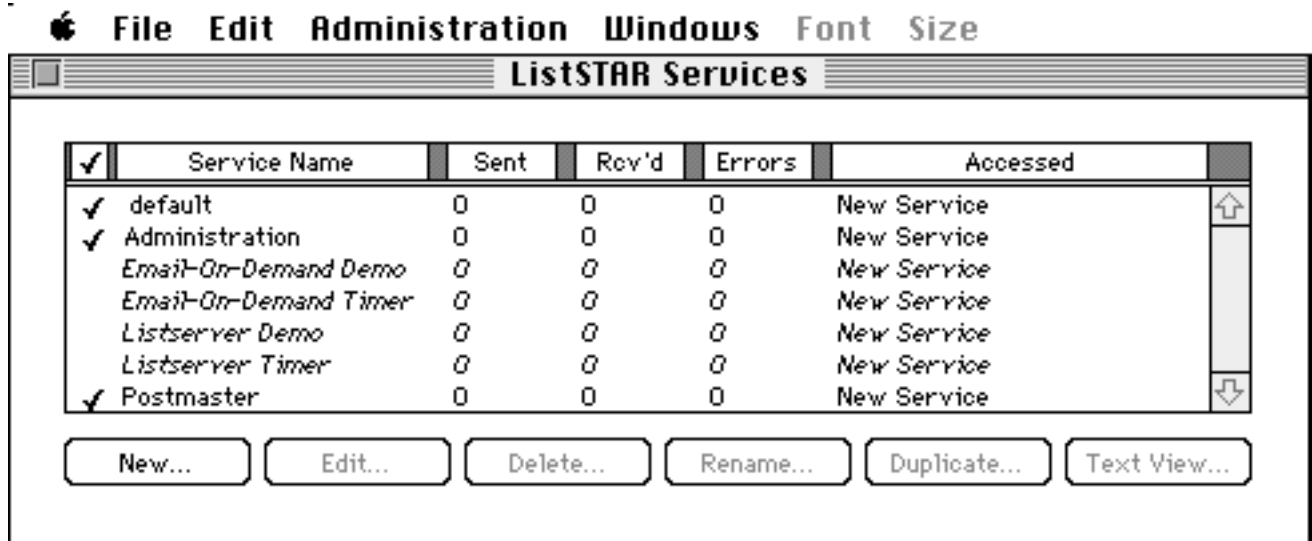


FIGURE 1 ListSTAR Server Menus

File and Edit Menus

The File menu contains standard entries for closing windows, printing, or quitting the application.

The Edit, Font, and Size menus also contain standard Macintosh entries for those menus. (Font and Size menu items apply only to the ListSTAR Log window, so they are disabled when that window is not active.)

You can use the Copy and Paste commands in the Edit menu to copy rules from one service to another.

Administration Menu

TABLE 1 Commands in the Administration Menu

Set Log Level	<p>Opens a hierarchical menu in which you can change the amount of information written to the log. Additional information is useful for debugging problems, but it is not usually needed for long term use and decreases server performance. These are the choices:</p> <ul style="list-style-type: none"> • No Logging Do not write messages to the log. <i>This is not recommended.</i> • Message Logging This is the default level, at which the ListSTAR Server logs information about messages sent and received as well as error messages. • Plus Status Changes At this level, the ListSTAR Server logs messages generated by the previous level and messages related to changes in ListSTAR Server status, which are preceded by #####. • Plus Debug Messages At this level, the ListSTAR Server logs messages generated by the previous levels and debugging messages, which are preceded by the word DEBUG. Debug messages are useful to debug a service when establishing it for the first time, or when you notice unpredictable results during ListSTAR Server operations. • Plus Protocol Transactions At this level, the ListSTAR Server logs all messages in the previous categories and low-level transaction messages, which are preceded by the word PROTOCOL. This log level is provided for debugging possible problems with SMTP transactions, but it causes a significant performance penalty and large log files.
Connect Now	Forces an immediate connection to the mail system. As the ListSTAR Server connects, you can observe the log messages generated. This command purges the list of host downs (if any) and attempts to send any outbound mail that is queued.
Suspend Processing	Finishes current processing and then suspends temporarily (for 15 seconds). On very busy servers, it is sometimes necessary to suspend processing of incoming and outgoing messages to do administrative actions such as working with the queue or changing a service's configuration. This command gives you time to open a configuration or mail queue window. The ListSTAR Server remains suspended while one of those windows is open.
Log Statistics	Generates a brief statistical report of ListSTAR Server operations in the log. See <u><i>Generating Statistics in the Log</i></u> for details.

Windows Menu

TABLE 2 Commands in the Windows Menu

Log	Opens the Log window, or if one is already open, makes it active (see <i>ListSTAR Log Window</i>).
Services	Opens the Services window, or if one is already open, makes it active (see <i>ListSTAR Services Window</i>).
Status	Opens the Status window, or if one is already open, makes it active. The Status window displays information about the number of messages sent and received by the ListSTAR Server, as well as information about the size of the spool folder and memory utilization. See <i>Status Window</i> for details.
Threads	Opens the Threads window, or if one is already open, makes it active. The Threads window shows activity statistics on various threads (see <i>Threads Window</i>).
Address Lists	Opens the Address List Maintenance window. This window lets you create, edit, and perform other functions on address lists (see <i>Address Lists Interface</i>).
Check Pending Mail	Opens a window on the mail queue. The actual physical files stored in the spool folder are in a format understood by the ListSTAR Server. Each message consists of two or (if enclosures are present) three files. When you use the Check Pending Mail command, you can work with addresses, view message status, and delete messages. See <i>Check Pending Mail Window</i> for details.
General Preferences	Opens the General Preferences configuration window (see <i>General Preferences Interface</i>).
Serial Numbers	Opens the Serial Number Maintenance window, where you can enter or delete serial numbers for ListSTAR software. See <i>Serial Numbers Window</i>

ListSTAR Log Window

The Log window lets you see log messages in real time as the ListSTAR Server operates. You can close the window by clicking the close box or choosing Close Window in the File menu.



FIGURE 2 Log window

The log window is not intended for viewing the entire log, but it provides a window on the server's recent activities. The log file is a text file and can easily be viewed with any text editor if you wish to view previous activities that are now outside of the window's view. The ListSTAR Log file is located in the ADMIN folder. When you create services, you can specify that a rule should write a message to the log, so you can watch rules processing as it occurs.

If you run into problems while the ListSTAR Server is operating, you can increase the level of messages written to the log to get more information about exactly what is occurring within the application. See [Administration Menu](#) for details.

Generating Statistics in the Log

To generate a brief statistics report of ListSTAR operations in the log, choose Log Statistics in the Administration menu. The statistics look like this:

```
5:18:41 PM [100]: +++++ Daemon statistics follow +++++
5:18:41 PM [100]: Execution time = 0 days; 1 hours; 56 minutes.
5:18:41 PM [100]: DEBUG:ADMIN statistics follow
5:18:41 PM [100]: ===== TCP Overall Connection Stats =====
5:18:41 PM [100]: tcp connection attempts (outgoing): 4
5:18:42 PM [100]: tcp connections opened (outgoing): 4
5:18:42 PM [100]: tcp connections accepted (incoming): 0
5:18:42 PM [100]: tcp connections closed: 2
5:18:42 PM [100]: tcp connections aborted: 2
5:18:42 PM [100]: tcp data bytes received: 4089
5:18:42 PM [100]: tcp data bytes sent: 763
5:18:42 PM [100]: tcp duplicate data bytes received: 2
5:18:42 PM [100]: tcp data bytes retransmitted: 0
5:18:42 PM [100]: tcp input packets: 65
5:18:42 PM [100]: tcp output packets: 90
5:18:42 PM [100]: tcp duplicate packets received: 2
```

```

5:18:42 PM [100]: tcp retransmitted packets: 2
5:18:42 PM [100]: ===== End of Stats =====
5:18:42 PM [100]: ++++++ End of Statistics Report ++++++

```

Audit Messages

The following messages are related to the internal audit performed by the ListSTAR Server on rules, services, and address lists. The audit is performed whenever the ListSTAR Server is launched or when a service is duplicated.

These messages appear after a rule has been edited or a service has been modified. They indicate that the ListSTAR Server has recognized the changes.

```

Modified rule 'name' of service 'name'
Modified service 'name',

```

These messages, displayed only when the Log Level has been set to Plus Protocol Transactions, indicate that the ListSTAR Server has located a file it was previously unable to access because the file's volume or folder was temporarily inaccessible:

```

Reconnected 'filename' in rule 'name' of service 'name', bad vref/vol name,
Reconnected 'file-name' in rule 'name' of service 'name', bad dirId,

```

This message indicates that the ListSTAR Server is unable to access the specified file:

```

fixFile: Could not reconnect file 'file-name' in rule 'name' of service 'name',

```

If you get the message shown immediately above, you should carefully examine the service and rule to see if you can correct the problem by hand.

These messages, displayed only when the Log Level has been set to Plus Debug Messages, can be displayed after a routine internal audit if the ListSTAR Server encountered problems:

```

Audit: Found a total of N services, modified N, found N with problems,
Audit: Found a total of N rules, modified N, found N with problems,
Audit: Examined a total of N file specs, modified N, found N with problems,

```

Error Codes

The following error codes can appear in the ListSTAR log. Error messages begin with the word ERROR, followed by a descriptive string and the error code. Any further information that accompanies this error message will be displayed on the following line.

TABLE 3 Macintosh error codes

Error Code	Description
-33:	Directory is full.
-34:	Disk is full.
-35:	No such volume.
-36:	I/O error.
-38:	File not open.
-39:	End-of-file.
-42:	Too many files open.

TABLE 3 Macintosh error codes (Continued)

Error Code	Description
-43 :	File not found.
-44 :	Diskette is write protected.
-45 :	File is locked.
-46 :	Volume is locked.
-47 :	File is busy.
-48 :	Duplicate filename.
-108	Not enough room in the heap zone of memory.
-109	Miscellaneous memory errors.
-192	A resource could not be found.

TABLE 4 AppleTalk error codes

Error Code	Description
-1096 :	Request failed.
-1097 :	Too many requests outstanding.
-1098 :	Too many sockets open.
-1099 :	Bad or unopened socket number.

TABLE 5 TCP/IP error codes

Error Code	Description
-23000 :	Unable to initialize the local network handler.
-23001 :	The manually set address is configured improperly.
-23002 :	A configuration resource is missing.
-23003 :	Not enough room in the application heap.
-23004 :	Error in getting address from a server or the address is already in use by another machine.
-23005 :	A TCPClose command was already issued so there is no more data to send on this connection.
-23006 :	The total amount of data described by the WDS was either 0 or greater than 65,535 bytes.
-23007 :	The TCP stream already has an open connection.
-23008 :	This TCP stream has no open connection.
-23009 :	There are already 64 TCP streams open.
-23010 :	The specified TCP stream is not open.
-23011 :	An open stream is already using this receive buffer area.
-23012 :	The TCP connection went down.
-23013 :	The receive buffer area pointer is 0.
-23014 :	The RDS refers to receive buffers not owned by the user.
-23015 :	The connection came up halfway and then failed.
-23016 :	The specified command action was not completed in the specified time period.

TABLE 5 TCP/IP error codes (Continued)

Error Code	Description
-23017:	A TCP connection already exists between this local IP address and the TCP port, and the specified remote IP address and TCP port.
-23032:	The packet is too large to send without fragmenting and the Don't Fragment flag is set.
-23033:	The destination host is not responding to address resolution requests.
-23035:	Ping of IP address failed.
-23036:	Insufficient internal driver buffers available to fragment this packet on send.
-23037:	No gateway available to handle routing of packets to off-network destinations.
-23041:	The hostname field had a syntax error. The address was given in dot notation (that is, W.X.Y.Z) and did not conform to the syntax for an IP address.
-23042:	The name specified cannot be found in the cache. The domain name resolver will now query the domain name server and return the answer in the callback procedure.
-23043:	No result procedure was passed to the address translation call when the resolver must be used to find the address.
-23044:	No name server can be found for the specified name string.
-23045:	This domain name does not exist.
-23046:	None of the known name servers are responding.
-23047:	The domain name server has returned an error.
-23048:	Not enough memory is available to issue the needed DNR query or to build the DNR cache.

Threads Information in the Log File

In a threaded environment, ListSTAR operations are reported in the log file in terms of active processes managed by different threads. Threads information in the log file can be used to debug SMTP transactions and determine where the ListSTAR Server is spending most of its time. Threads information is recorded in the log file by thread ID number enclosed in brackets. This number precedes the message that describes the process. Thread ID numbers start at 100, as shown in the sample log file below:

```
3:58:45 PM [100]: Initializing version 1.0.0 of Built 4/10/1995 at 9:44:21 AM.
3:58:47 PM [100]: Default Router (hostname): abc.abc.com
3:58:47 PM [100]: My hostname: liststar.abc.com
3:58:47 PM [100]: ListSTAR Administrator Address: Postmaster
3:58:47 PM [100]: Unlimited license.
3:59:05 PM [100]: Date: Monday, May 15, 1995.
```

Thread number 100 is the main thread. It is responsible for invoking all user interface elements, as well as spawning all other threads except for the SMTP listeners, which are always in existence.

```
3:59:56 PM [104]: Received From: Regina Stoeffler <regina@abc.com>; Size: 802
3:59:56 PM [104]: Rcpt: wsorders@liststar.abc.com
```

One of the listener threads has received a message and spooled it to disk. The main thread has recognized that a file was received and created thread 104 to process the incoming file. Messages from the receiver threads will only be displayed if they encounter an error or if the logging level is set to a level greater than "Message Logging".

3:59:59 PM [104]: WebSTAR order Filed
3:59:59 PM [104]: WebSTAR order forwarded to Pete

These are messages output by rule actions "send message to log".

4:00:06 PM [106]: Sending From: wsorders@liststar.abc.com; Size: 802
4:00:06 PM [106]: Rcpt: peter@abc.com
4:00:06 PM [106]: Rcpt: regina@abc.com

Each message that is generated during rules processing will be assigned to a newly created thread for processing and sending.

4:00:07 PM [107]: Sending From: wsorders@liststar.abc.com; Size: 599
4:00:07 PM [107]: Rcpt: regina@abc.com
4:00:28 PM [108]: Received From: MAILER-DAEMON@jpmorgan.com (Mail Delivery Subsystem);
Size: 3165
4:00:28 PM [108]: Rcpt: liststarbeta@liststar.abc.com
4:00:29 PM [108]: liststarbeta: Mailer-Daemon message received and filed.
4:01:06 PM [110]: Sending From: liststarbeta@abc.com; Size: 3165
4:01:06 PM [110]: Rcpt: bid@abc.com
4:05:51 PM [112]: Received From: "Larry Urquhart" <larry@abc.com>; Size: 693
4:05:51 PM [112]: Rcpt: generatekey@liststar.abc.com
4:06:11 PM [114]: Received From: "Larry Urquhart" <larry@abc.com>; Size: 693
4:06:11 PM [114]: Rcpt: generatekey@liststar.abc.com
4:06:11 PM [115]: Sending From: generatekey@liststar.abc.com; Size: 663
4:06:11 PM [115]: Rcpt: larry@abc.com
4:09:08 PM [118]: Sending From: generatekey@liststar.abc.com; Size: 319
4:09:08 PM [118]: Rcpt: larry@abc.com
4:19:17 PM [121]: Received From: "Larry Urquhart" <larry@abc.com>; Size: 692
4:19:18 PM [121]: Rcpt: generatekey@liststar.abc.com
4:19:33 PM [122]: Received From: "Larry Urquhart" <larry@abc.com>; Size: 692
4:19:33 PM [122]: Rcpt: generatekey@liststar.abc.com
5:00:54 PM [100]: generating TOC digest for ListSTAR
5:00:56 PM [100]: TOC digest sent

Thread 100 (the main thread) is also responsible for handling timer services. Thus, the two messages above, which are the result of a timer action are associated with thread 100.

5:01:14 PM [134]: Sending From: generatekey@liststar.abc.com; Size: 663
5:01:14 PM [134]: Rcpt: larry@abc.com
5:01:15 PM [133]: Sending From: generatekey@liststar.abc.com; Size: 319
5:01:15 PM [133]: Rcpt: larry@abc.com
5:01:43 PM [100]: +++++ Daemon statistics follow +++++
5:01:43 PM [100]: Execution time = 0 days; 1 hours; 2 minutes.
5:01:43 PM [100]: 7 mail messages sent.
5:01:43 PM [100]: 6 mail messages received.
5:01:44 PM [100]: +++++ End of Statistics Report +++++
5:01:44 PM [100]: Closing

ListSTAR Services Window

The Services window lets you see which services are configured, which ones are enabled (preceded by a check mark), and some statistics about each service's operations. You can close the window by clicking the close box or choosing Close Window in the File menu.

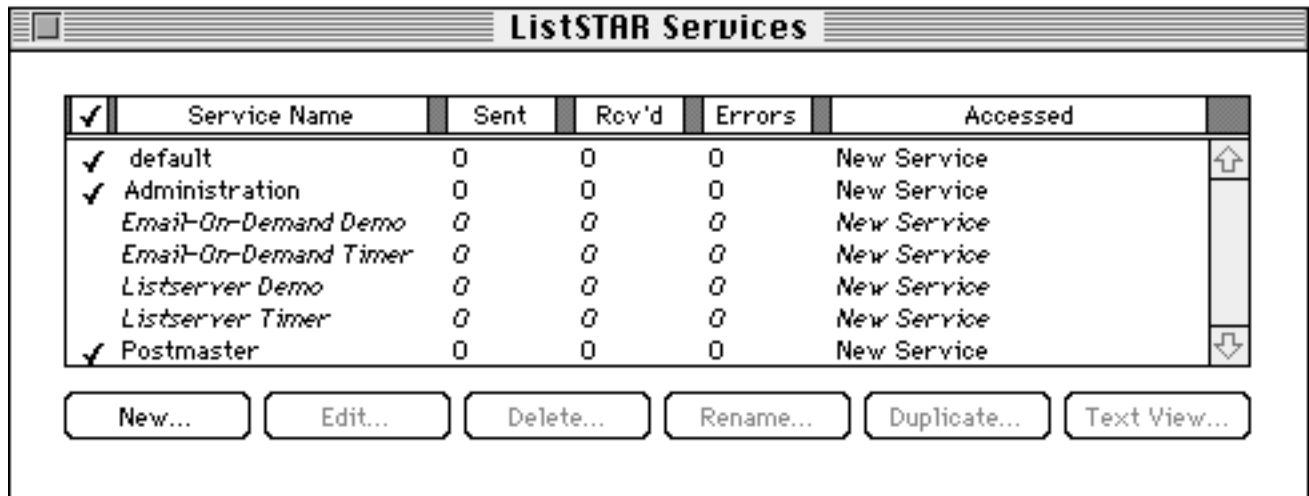


FIGURE 3 Services window

The example services shown in FIGURE 3 will be present in the initial Services window if you did an Easy Install or if you selected the example services in a Custom Install. The Postmaster service is required to handle routine messages addressed to postmaster.

- ❖ **Note:** ListSTAR/SMTP has the concept of a default service. Because the SMTP version operates as a server that receives mail for all of its services and routes it internally, it may make sense to configure a default service to process mail that is not addressed to other services. The default service lets the administrator specify default message handling and prevent the ListSTAR Server from returning mail automatically when it doesn't find the service. The service name "default" must start with a space character to be recognized.

The columns in the Services window show the name of each service, how many messages have been sent, received, or generated errors, and when each service was last accessed (the last time a mail message was sent or received by the service). If a service is preceded by a check mark, it is enabled. Click on the check mark to uncheck (disable) the service, or click in the empty space preceding the service to check (enable) it. Disabled services are not preceded by a check mark, and are shown in italics.

The buttons in the Services window let you work with services at this top level. Except for the New button, the buttons operate on a single highlighted service. They provide the following functions:

TABLE 6 Buttons in the Services Window

New	Opens a dialog in which you can create a new service. See <i>FIGURE 4</i> .
Edit	Opens the service configuration dialog for a service. This is the equivalent of double-clicking on a service.
Delete	Deletes a service.
Rename	Opens a dialog in which you can assign a new name to a service.
Duplicate	Creates a copy of a service and opens a dialog in which you can specify a name.
Text View	Opens a read-only window that contains a text version of the rules in a service.

When you create a new service by clicking the New button, a dialog opens in which you must supply a name for the service and choose the appropriate type in a pop-up menu.

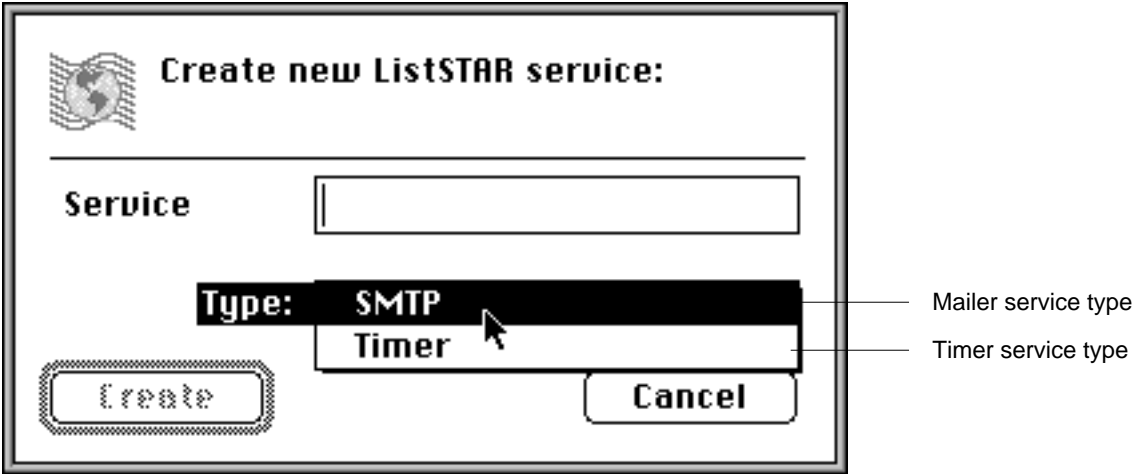


FIGURE 4 Creating a New Service

If you don't see the mailer type in the pop-up menu, there was probably an error on initialization. You should check the log file for ERROR messages. Then, quit the ListSTAR Server and restart it.

Service Preferences Interface

Account Information Window

ListSTAR/SMTP operates as a server. When an external SMTP host contacts the ListSTAR Server, it receives mail for all of its services and routes the mail to the appropriate service internally. This address information is used to route incoming mail to the right service (the right set of rules). On outbound mail, the ListSTAR Server uses this information as the From address in generated replies, routine messages generated by a Timer rule, and (optionally) when the ListSTAR Server forwards mail to a list.

Each service needs to be configured with the address information shown in this window:

The screenshot shows a window titled "mylist" Service Preferences. On the left is a sidebar with two icons: a person icon labeled "Account" and a document icon labeled "Rules". The main area is titled "SMTP Account Information" and contains two text input fields. The first field is labeled "Friendly Name:" and contains the text "Comments". The second field is labeled "Email Address:" and contains the text "listserv@abc.com".

FIGURE 5 SMTP address information

TABLE 7 Address Fields

Friendly Name	Type a descriptive name for the service. This name will appear as part of the RFC header in outgoing mail. For example, "ListSTAR Comments" in the From address in this example header:
---------------	---

```
Received: from abc.abc.com (listserv.abc.com [198.211.93.25])
by abc.com (8.6.10/8.6.10) with SMTP id NAA22662 for
<bid@abc.com>; Fri, 24 Feb 1995 13:22:40 -0800
Date: Fri, 24 Feb 1995 13:22:40 -0800
Message-ID: <n1418490334.60185@abc.abc.com>
From: "Comments" <listserv@abc.com>
Subject: Re: help
```

Email Address	Type the e-mail address for the service. The ListSTAR Server scans the recipient address in an incoming message for user information (everything to the left of the at-sign) to route the mail. The hostname portion of the address (everything to the right of the at-sign) depends on how addresses are administered on your local SMTP network. If you are not sure, ask the network administrator.
---------------	--

Rules List Window

ListSTAR allows you to create a set of *rules* that are applied to an incoming mail message. These rules can take specific actions based on the content of the message (subject, address, or message content). Click the Rules icon in the left column of the Preferences dialog to see a list of rules.

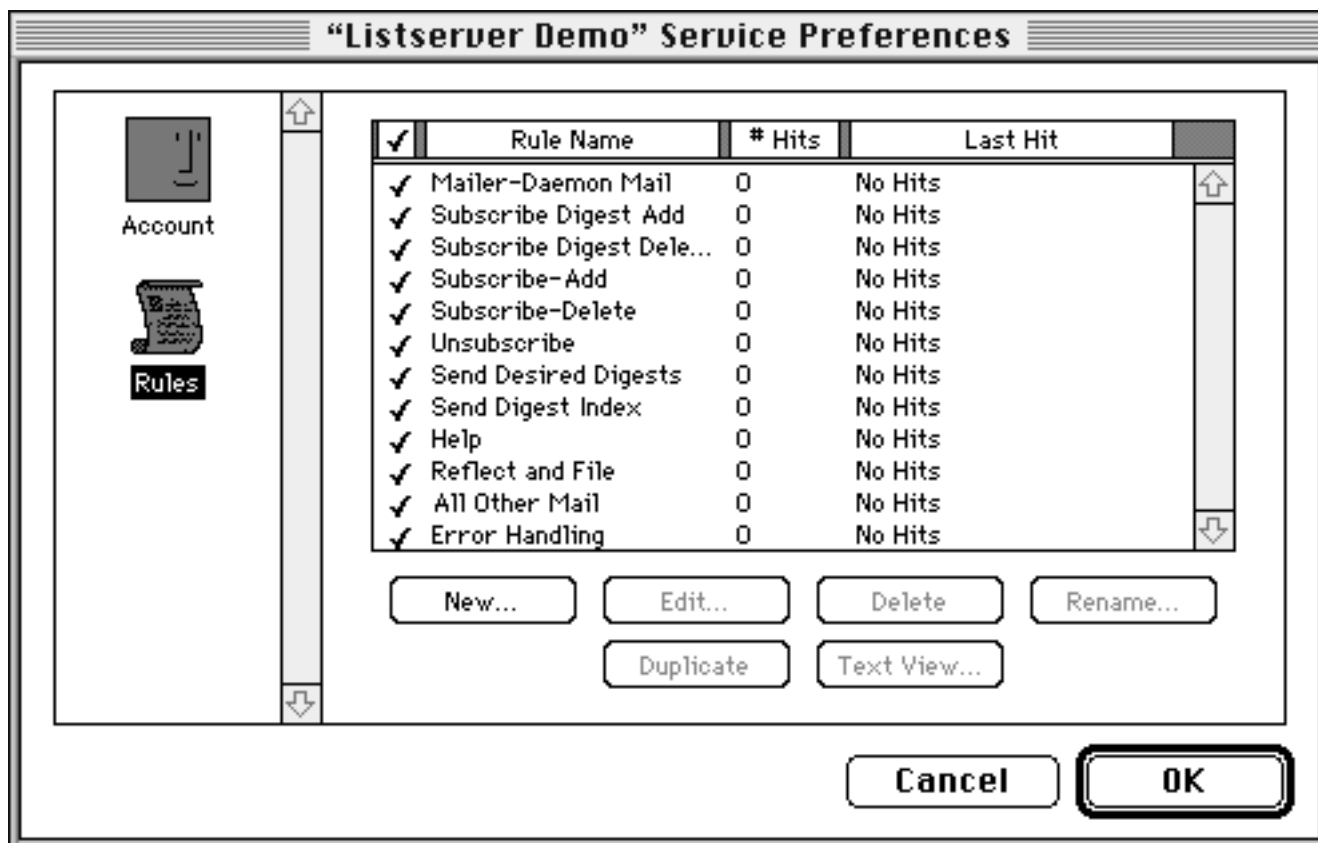


FIGURE 6 Ordered set of rules

The columns in the Rules window show the name of each rule, how many times it has been hit, and when it was last hit. A rule is hit if it succeeds (if the conditions it is looking for are true).

If a rule is preceded by a check mark, it is active. Click on the check mark to uncheck (temporarily disable) the rule, or click in the empty space preceding the rule to check (enable) it.

The rules start processing at the top and run to the bottom. To change the order in which rules appear (to change the logic of the service), just click on a rule and drag it up or down in the list. The mouse-arrow changes to a hand. When you release the mouse button, the rule will be placed in the position indicated by the arrow when you release the mouse button.

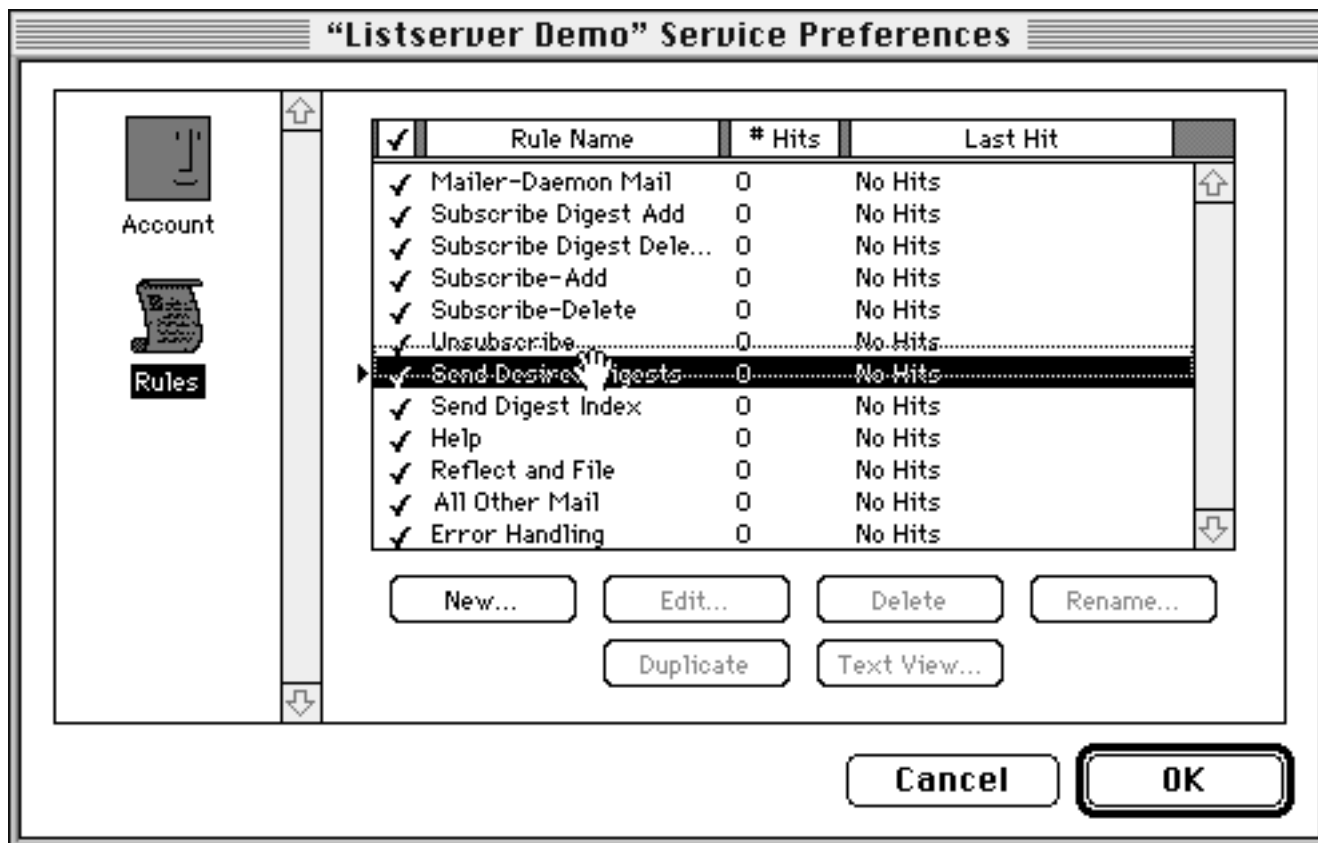


FIGURE 7 Reordering Rules

The buttons in the Rules window let you work with rules. Except for the New button, the buttons operate on a single highlighted rule. They provide the following functions:

TABLE 8 Buttons in the Rules Window

New	Opens a dialog where you can specify the name for a new rule. New rules are placed at the bottom of the rules list.
Edit	Opens the rule definition window for a rule. This is the equivalent of double-clicking on a rule.
Delete	Deletes a rule.
Rename	Opens a dialog where you can change a rule's name.
Duplicate	Creates a copy of a rule and opens a dialog in which you can specify a name for it. All of the original rule's triggers and actions will be duplicated and the copy will be inserted just below it in the list. You can also copy a rule by pressing Command-c, and then using Command-v to paste it.
Text View	Opens a read-only window that contains a text version of the triggers and actions in a rule.

Rules Definition Interface

To open the rules definition window, double-click a rule in the list or click New and create a new rule

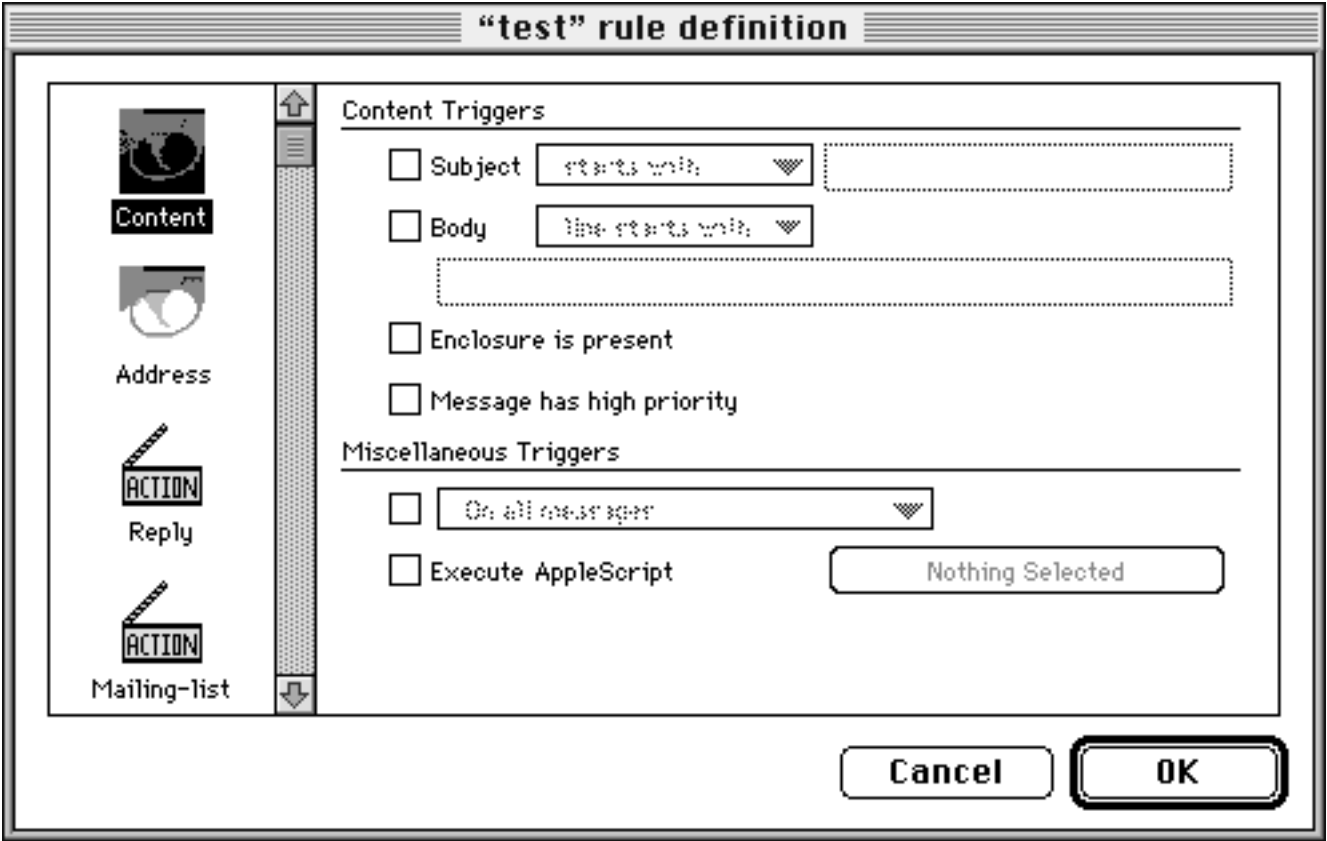


FIGURE 8 Rule Definition window

Selecting one of the icons in the left column of this window opens a group of related triggers or actions. For a new rule, all unselected options are unchecked and dimmed. To view the dimmed options, click the check box preceding an item.

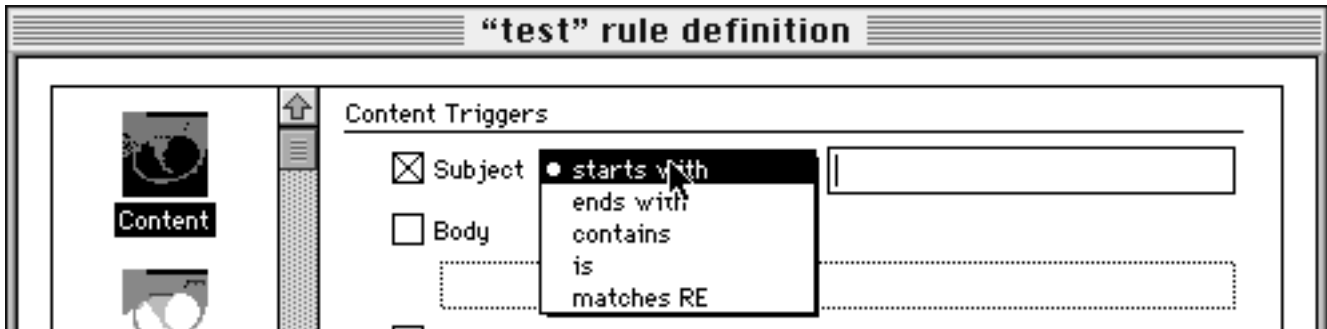


FIGURE 9 Check an item to view its options

The buttons in the rules definition interface provide the following functions:

TABLE 9 Buttons in the Rules Definition Interface

OK	Saves all changes and closes this window. You don't need to click OK after configuring items related to one icon. When you click another icon in the left column, the changes you made are saved automatically.
Cancel	Discards all unsaved changes and closes this window.

Mailer Service Rule Definition Windows

This section describes the triggers and actions in the rule definition interface for Mailer services. See [Timer Service Rule Definition Interface](#) if you are configuring a Timer service.

Content Triggers

Click the Content Trigger icon to set triggers based on the content of a message.

❖ **Note:** All text matching operations are case insensitive.

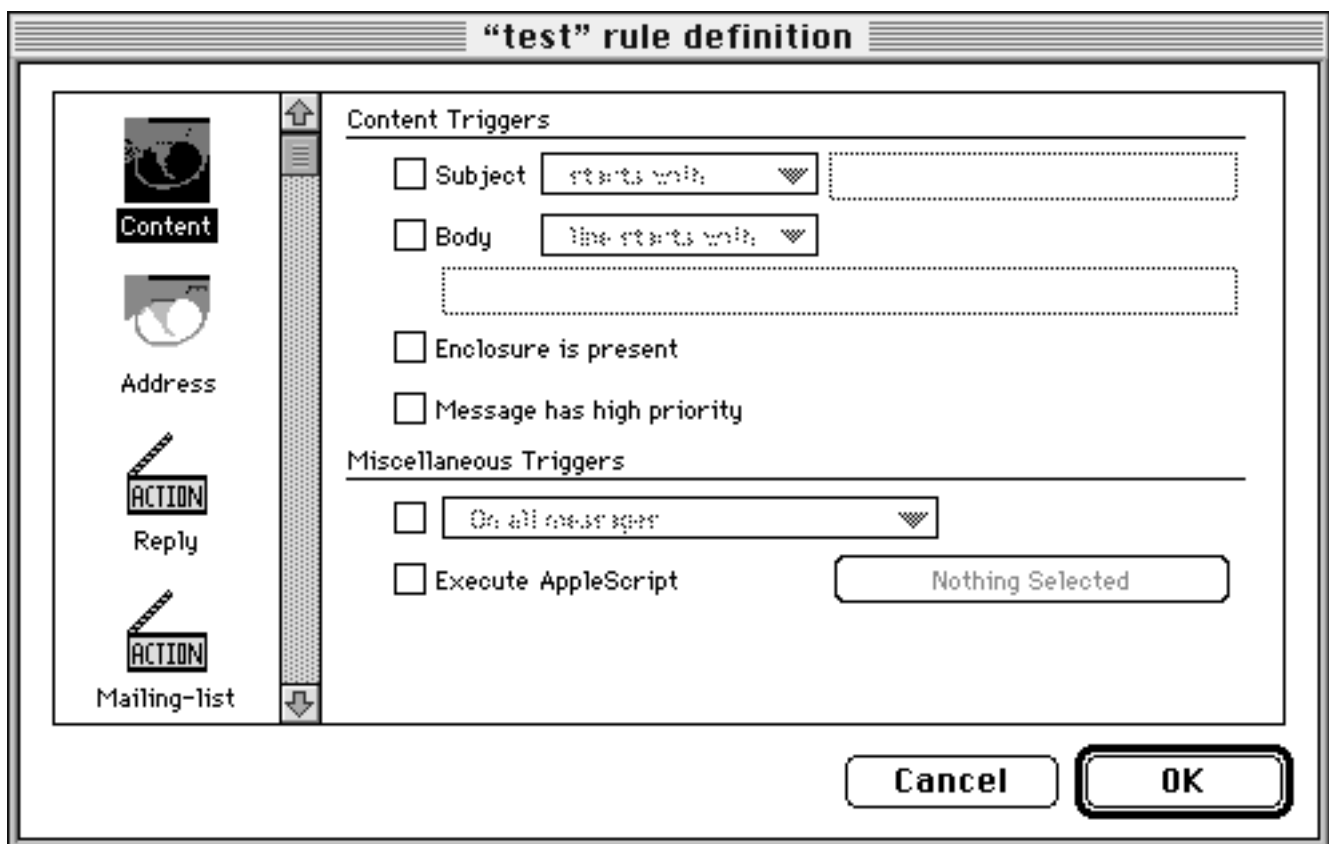


FIGURE 10 Content Triggers (Mailer Service)

TABLE 10 Content Triggers

Subject	<p>Looks for specified text in the Subject of a message. Some mail servers use Subj instead of Subject, so this rule will scan either header. Check the Subject check box, choose the text matching operation to perform, and then type the text to match.</p> <p>Text matching operations match Subjects that <i>start with</i>, <i>end with</i>, <i>contain</i>, or <i>exactly match</i> the text, ignoring case.</p> <ul style="list-style-type: none"> • <i>Matches RE</i> matches text in Subjects that matches the specified regular expression. Data that matches a regular expression can be saved internally and passed to an AppleScript. See Regular Expression Support for important details.
Body	<p>Looks for specified text in the Body of a message. Check the Body check box, choose the text matching operation to perform, and then type the text to be matched.</p> <p>Text matching operations match lines that <i>start with</i> or <i>contain</i> the specified text. When the <i>start with</i> option is used, the text matching operation starts with the first characters in each line. White space at the start of a line in the message body is <i>not</i> discarded in that case.</p> <ul style="list-style-type: none"> • <i>Matches RE</i> matches text in a line that matches the specified regular expression. Data that matches a regular expression can be saved internally and passed to an AppleScript. See Regular Expression Support for important details.
Enclosure is present	Looks for the presence of a file enclosure. The number and type of enclosures aren't significant, just the fact that one or more is present.
Message has high priority	High priority is the highest level of priority supported within a mail system.

TABLE 11 Miscellaneous Triggers

On all messages	<p>This trigger invokes an action for every message. Check the box next to the pop-up and then select it to trigger actions that will occur regardless of specific conditions in the incoming message.</p> <p>You can position a rule with this trigger at or near the end of the rule list and use it as a final catch-all. If you include Stop Rule Processing actions in previous rules, the rule with this trigger will be processed only if those previous rules were not hit. (See Stop rule processing.) For example, you can use this trigger to make sure that the From address in the incoming message is always added to an address list, even if no previous triggers succeeded.</p>
When previous rule(s) hit	<p>This trigger succeeds only if at least one of the previous rules was hit. Use it to stop processing the message or to log transaction information at a certain point after an action has been invoked.</p> <p>This trigger is often used to invoke the Stop Rules Processing action. For example, you can position a rule with this trigger after rules that search for valid commands. If a previous rule was hit (a valid command was found), the rule with this trigger can invoke Stop Rules Processing to make sure that the message is not processed further. (See Stop rule processing.)</p>

TABLE 11 Miscellaneous Triggers (Continued)

No previous rules hit	<p>This trigger succeeds only if none of the previous rules was hit. A rule with this trigger is usually positioned at or near the end of the rule list.</p> <p>The default way to handle no-hit messages is to discard them with no action. Use this trigger to catch them for handling in some other way. For example, you might want to file them or return a Help message.</p>
When processing errors occurred	<p>This trigger succeeds only if errors occurred while processing the triggers and actions associated with a rule, not if other internal errors occur.</p> <p>When an error occurs while processing a rule's triggers or actions, all subsequent rules in the ordered list are searched (not executed) for rules that contain the on-errors trigger. If one is found, it will be executed like a normal rule, that is, all of its trigger conditions must be true for the actions to take place.</p> <p>On-errors rules may specify actions to occur in addition to the default on-error message handling, in which rule processing is terminated and the message is returned to the queue where it will be reprocessed at the next <i>Retry queued mail</i> interval. This default action always occurs: if no on-errors rules are found, if an on-errors rule is found which itself returns an error, or if an on-errors rule is found and executed successfully.</p>
Execute AppleScript	<p>This trigger executes the selected AppleScript and succeeds or fails based on its outcome. Check the Execute AppleScript check box, then click the Nothing Selected button to locate and select the script. See <i>Writing an AppleScript to be Executed as a Trigger</i> for important details.</p>

Address Triggers

Click the Address Trigger icon to set triggers based on the addresses of a message. Note that all text matching operations are case insensitive.

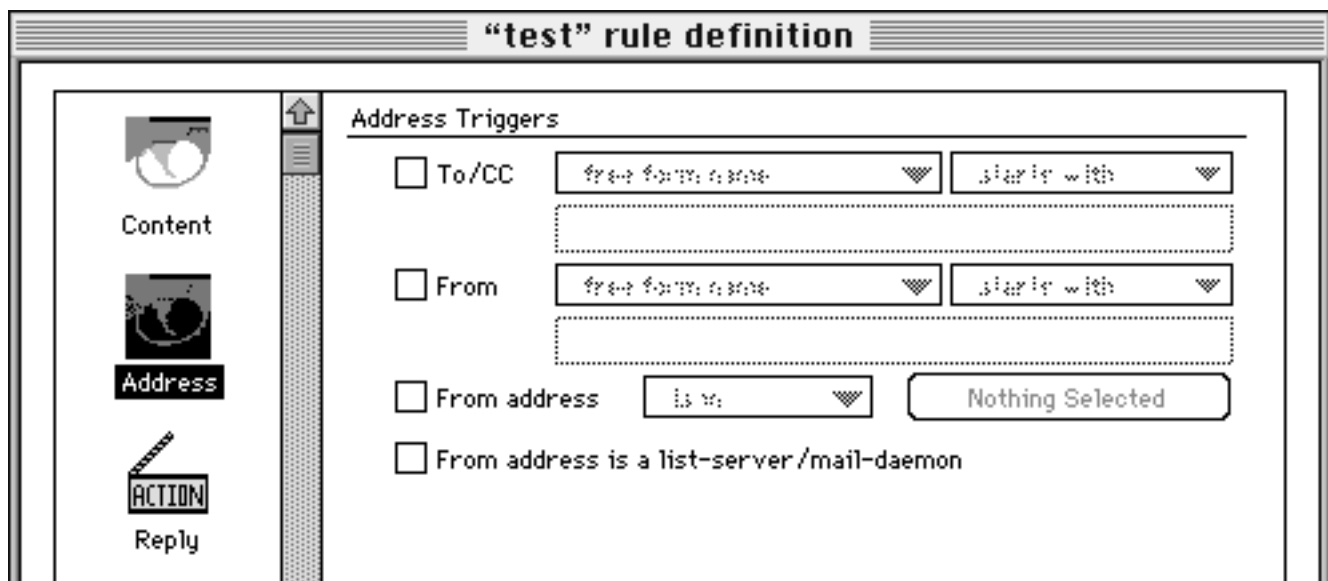


FIGURE 11 Address Triggers (Mailer Service)

TABLE 12 Address Triggers

To/CC	<p>Looks for a particular envelope addresses. Check the To/CC check box. Then, choose an address field, choose the text matching operation to perform, and type the text to match.</p> <p>Address fields:</p> <ul style="list-style-type: none">• free form name—the combination of a user’s first and last names (not relevant to SMTP or POP3 addresses)• e-mail address—using the syntax user@domain• server name—name of the Macintosh server or gateway (not relevant to SMTP or POP3 addresses) <p>The text matching operations match addresses that <i>start with, end with, contain or exactly match</i> the specified text, ignoring case.</p> <ul style="list-style-type: none">• <i>Matches RE</i> matches text in addresses that matches the specified regular expression. See <u>Regular Expression Support</u> for important details.															
From	<p>Looks for a particular From address. Check From and then choose an address field, choose the text matching operation to perform, and type the text to match.</p> <p>Address fields: Same as described above for To/CC</p> <p>Text matching operations: Same as described above for To/CC</p>															
From address is in	<p>Looks in the selected address list file for the sender’s address. Check the From Address check box, choose “is in” or “is not in,” and then click the Nothing Selected button to locate and select the address list file. See <u>Selecting Lists in Services</u>.</p> <p>If “is in” is specified and multiple lists are selected, this trigger will return true if the From address is in <i>at least one</i> of the specified lists (not all of the lists). If “is not in” is specified and multiple lists are selected, this trigger will return true if the From address is in <i>none</i> of the lists. User names are not displayed in the Address list window in this context.</p>															
From address is a listserver/mail-daemon	<p>Looks for reserved addresses that are typically associated with non-delivery reports, host-down messages, or other control messages. It looks for addresses that contain one of the following strings:</p> <table><tr><td>Postmaster</td><td>Postman</td><td>Postoffice</td><td>Mailer</td><td>daemon</td></tr><tr><td>mmdf</td><td>root</td><td>uucp</td><td>services</td><td>server</td></tr><tr><td>listserv</td><td>owner</td><td>request</td><td>bounce</td><td></td></tr></table> <p>It’s important to handle messages from reserved addresses so they are not reflected out to members of a list. See the Demo services described in the <u>Getting Started</u> guide.</p>	Postmaster	Postman	Postoffice	Mailer	daemon	mmdf	root	uucp	services	server	listserv	owner	request	bounce	
Postmaster	Postman	Postoffice	Mailer	daemon												
mmdf	root	uucp	services	server												
listserv	owner	request	bounce													

Reply Actions

Click the Reply Action icon to define actions related to generating a reply message and creating the reply message body.

The screenshot shows a window titled "test" rule definition. On the left is a vertical sidebar with icons and labels: "Content" (envelope icon), "Address" (envelope icon), "Reply" (clapperboard icon with "ACTION" and "Reply" text), and "Mailing-list" (clapperboard icon with "ACTION" text). The main area is divided into two sections: "Reply Actions" and "Body Actions".

Reply Actions:

- ☐ reply to sender (dropdown menu) [Nothing Selected button]
- ☐ Subject (dropdown menu) [Empty text box]
- ☐ Add enclosure(s) [Nothing Selected button]

Body Actions:

- ☐ Add message [Empty text box]
- ☐ Add file [Nothing Selected button] [Edit button]
- ☐ Add processing history
- ☐ Add original message body

FIGURE 12 Reply Actions (Mailer Service)

TABLE 13 Reply Actions

Reply to Sender	<p>Generates a message. First click the check box. Then choose Reply to Sender (to reply to the From address of the message) or Send To (to generate a new message).</p> <p>When Send To is selected, click the Nothing Selected button to choose one or more address lists as the recipients. You can then set all attributes of the message and create the message body by using the options described below.</p> <p>Reply to Sender has these implied operations:</p> <ul style="list-style-type: none"> • Set the TO address of the reply to the From address of the message • Set the From address of the reply to the account address of this service <p>❖ Note: ListSTAR can generate only one outbound message per rule.</p>
Subject	<p>Sets the Subject of the reply message. Check the Subject check box, choose how to set the message, and then type the text you want to use.</p> <p>How to set the message:</p> <ul style="list-style-type: none"> • Set To—use the specified text as the Subject of the reply • Starts With—start with the specified text, followed by the Subject of the original message <p>For example, you can choose Starts With and enter “Re:” or “Re:>”.</p>
Add enclosure(s)	<p>Adds the selected files as enclosures to the reply message. Check the Add Enclosure(s) check box and then click the Nothing Selected button to locate and select the files.</p>

TABLE 14 Body Actions

Add message	Uses the specified text as the body of the reply message. Check the Add Message check box and then type a brief outgoing message, which is limited to 255 characters and cannot contain any end-of-line characters. If your message needs to be longer, we recommend that you use the Add File action instead, and specify the outgoing message in a text file.
Add file	Uses the content of the selected file as the body of the reply message. Check the Add File check box and then click the Nothing Selected button to locate and select the file. To open the file in an edit window where you can compose or modify the selected file, click the Edit button.
Add processing history	<p>Adds the rules-processing history of a message to the outgoing message. The history specifies whether each previous rule was hit, not hit, or if errors occurred.</p> <p>This action is typically used for debugging purposes. Also, some EMail-On-Demand administrators like to add the processing history of a message to the outgoing message as a validation of the response. It is most useful when it occurs in one of the last rules in the rule list (so that it adds a more extensive processing history).</p>
Add original message body	Adds the original message body to the body of the reply message, preceded by ----- original message follows -----.

Mailing-List Actions

Click the Mailing-List Action icon to define actions related to reflecting messages, working with digest files, and adding RFC header information contained in a file.

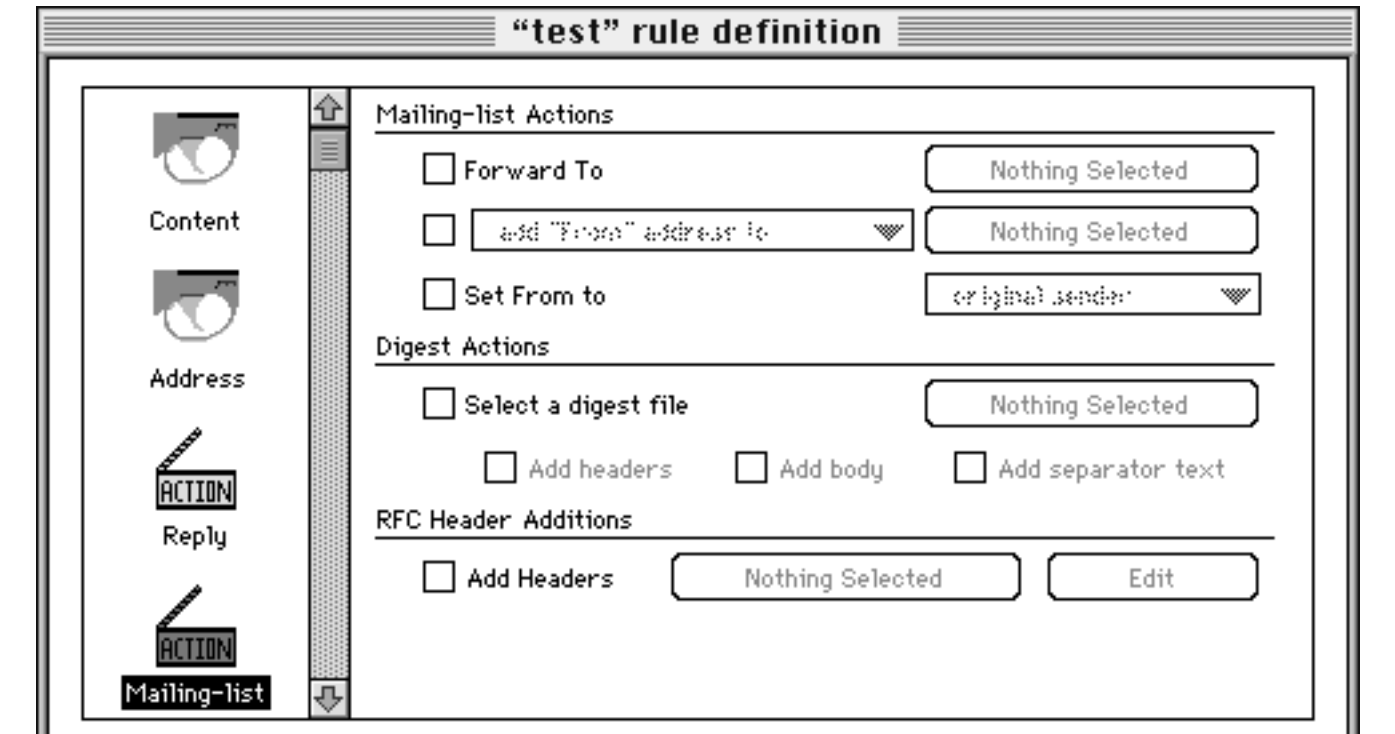


FIGURE 13 Mailing-List Actions (Mailer Service)

TABLE 15 Mailing-List Actions

Forward to	<p>Forwards the message being processed to members of an address list or user. Check the Forward To check box and then click the Nothing Selected button to select the address list. See <i>Selecting Lists in Services</i>. If multiple address lists or user lists are specified, the message is sent to <i>all</i> users specified.</p> <p>▲ Important: The order of a service's rules should ensure that certain checks have been performed before a message is forwarded. For example, a preceding rule should verify that the message is not from a reserved address.</p> <p>This action has the following implied operations:</p> <ul style="list-style-type: none"> • Preserve the subject of the message • Preserve the From address of the message • Preserve the body of the message • Preserve any enclosures in the message • Preserve the To/CC addresses of the message • Obtain the recipient addresses from specified address list(s) <p>❖ Note: ListSTAR can generate only one outbound message per rule. If you have already specified a reply message to the sender, use a new rule to forward a message.</p>
Add/delete address	<p>Adds the From address to an address list or deletes it from one. Check the Add 'From' Address To check box, choose whether to add or delete the address, and then click the Nothing Selected button to locate and select the address list files.</p> <p>If Add is specified and multiple address lists are selected, the From address will be added to <i>all</i> of the lists. If Delete is specified and multiple address lists are selected, the From address is deleted from each of the lists (if it is present in the list). It is an error condition for the From address to be in <i>none</i> of the lists.</p> <p>User lists are not displayed in this context.</p>
Set From to	<p>Sets the From address of the message being forwarded. You can use this item to cause forwarded messages to be From the service address instead of the original sender.</p> <p>Check the Set From To check box and then choose either the original sender of the message (the default), or the account address (the address associated with this service). If you set the From address to the account address for this service, the RFC header of the forwarded message will be modified in this manner:</p> <ul style="list-style-type: none"> • The original From: label will be changed to Sender: • A new From: line will be inserted into the RFC header. The new line will specify the account address in RFC syntax. <p>This option is disabled in the QuickMail and Microsoft Mail versions of ListSTAR.</p>

TABLE 16 Digest Actions

Select a digest file	<p>A <i>digest</i> is one file in which multiple messages are allowed to accumulate. You can then forward the digest as a single message instead of forwarding each message separately. For busy lists that receive many messages each day, we recommend the use of digests.</p> <p>Check the Select Digest check box and then click the Nothing Selected button to locate and select the digest file. When a digest file has been selected, the three options listed immediately below are enabled. You can uncheck one or more of them as you wish.</p>
Add headers	When checked, include the message’s header information in the digest. Header information includes the Subject, Date, and From address.
Add body	When checked, include the message body in the digest.
Add separator text	When checked, include a dashed line between messages to keep the digest legible.

TABLE 17 RFC Header Additions

Add Headers	<p>When checked, you can edit and select a file that specifies additions to the standard RFC 822 header sent with all Internet mail. <i>The additions must be RFC-compliant.</i> The following minimal syntax checks are performed on each RFC item entered:</p> <ul style="list-style-type: none">• The line must contain at least one colon (:) character• There can be no spaces to the left of the colon (:) character.• Some text must follow the colon (:) character. <p>If a line doesn’t meet these requirements, it is not added to the header. Neither are any of the lines following it.</p> <p>❖ Note: ListSTAR will not validate the contents of the added header fields. If they are incorrectly formatted, messages could be lost.</p> <p>If you are not familiar with RFC header fields, we recommend that you read RFC 822 before adding information here. Click Edit to open an edit window in which you can add RFC-compliant lines to be appended to the header of outgoing messages. You can add registered header fields such as the following to the standard RFC header, where <i>address</i> is the service address.</p> <div><pre>Precedence: Bulk Reply-To: address Errors-To: address</pre></div> <p>A header field is composed of a field name followed by a colon (:), followed by the field body (a valid address), and terminated by a Return character. The characters must be printable ASCII text.</p> <p>This option is disabled in the QuickMail and Microsoft Mail versions of ListSTAR.</p>
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Miscellaneous Actions

Click the Miscellaneous Action icon to define important ListSTAR actions that do not fit into previous categories, or to execute an AppleScript.

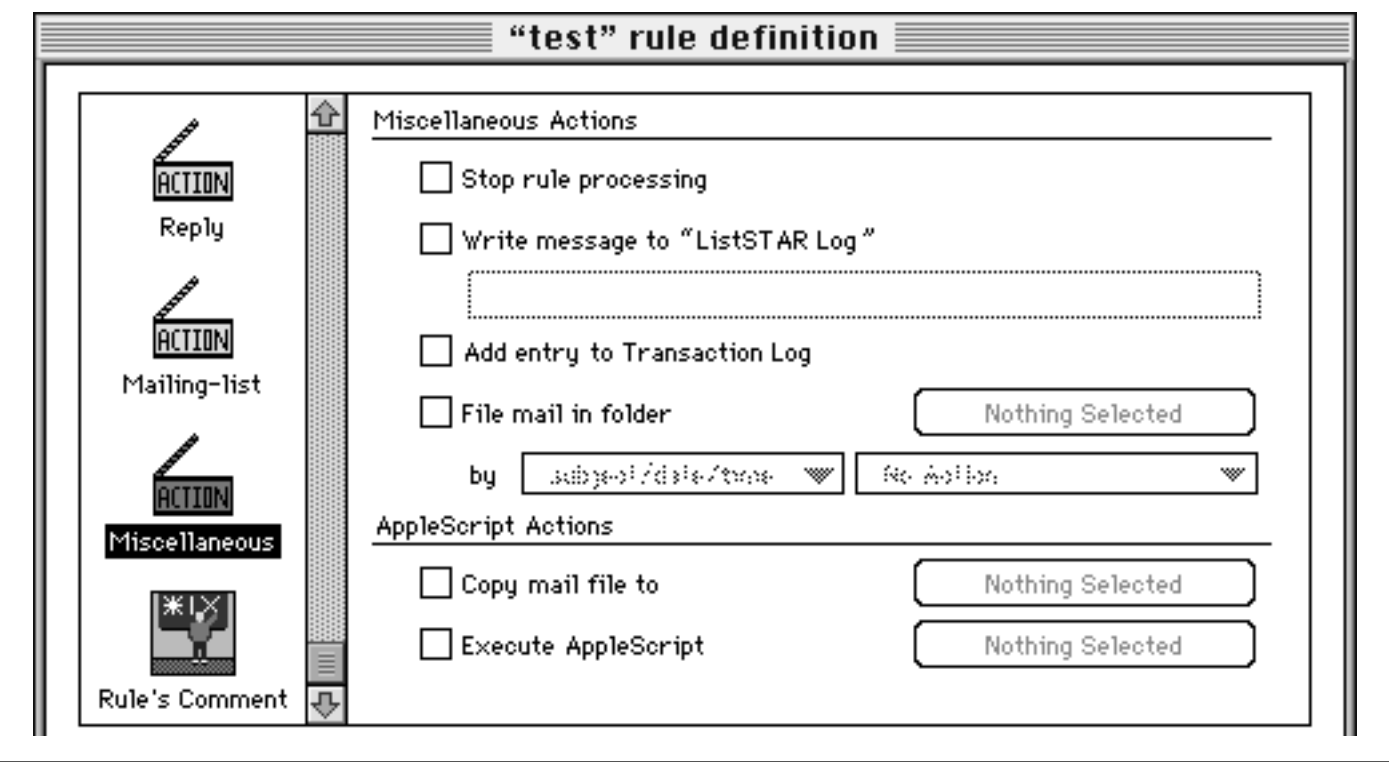


FIGURE 14 Miscellaneous Actions (Mailer Service)

TABLE 18 Miscellaneous Actions

Stop rule processing	<p>Sets a flag that forces an exit of rule processing after the current rule has been executed. This action is most commonly used to avoid inappropriate rule hits later in the list.</p> <p>For example, suppose a rule has a trigger looking for Subscribe in the Subject and that trigger succeeds. After invoking the action of adding the From address to an address list, it would be appropriate to also include the Stop Rule Processing action, especially if the next rule to be processed sends back a help message.</p> <p>To avoid sending an inappropriate help message, you want to stop rules processing as soon as the current rule is finished processing. To do that, specify the Stop Rule Processing action.</p> <p>Examples of rules in which you would <i>not</i> want to set the stop-processing flag are those that are scanning the body of a message for actions that are to be taken, normally related to returning information to a user. Usually autoreponse systems allow a user to request multiple files to be returned, but a rule will only trap for one of the items. So, you want the mail message to be processed by several rules so that all of the information requested will be returned. After all rules scanning for specific body content have been processed, you could then set up a rule that would invoke Stop Rule Processing if previous rules were executed. See <i>When previous rule(s) hit</i>.</p>
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TABLE 18 Miscellaneous Actions (Continued)

Write message to Log	<p>Writes the specified message to the log. You can use the message to provide debug information, or just as a quick indicator that something has happened. It will be displayed in the log window as soon as this rule is executed.</p> <p>Check the Write Message To Log check box, and then type a brief message in the text field.</p>
Add entry to Transaction Log	<p>Adds a transaction entry to the Transaction Log. A transaction entry includes the date the rule was executed, the name of both the service and rule that executed, the subject of the message, and addressing information about the From address.</p> <p>The Transaction Log is a tab-separated text file that can be imported into other applications such as databases or spreadsheets.</p>
File mail in folder	<p>Saves the message being processed as a plain text file in the selected folder. Check the File Mail In Folder check box and then click the Nothing Selected button to locate and select the folder. The next pop-up lets you assign a unique filename by choosing one of these options:</p> <ul style="list-style-type: none"> • subject/date/time (the Subject of the message followed by the date and time it was received) • subject/date • subject • date • date/subject • date/time • date/time/subject <p>If a duplicate name occurs, an algorithm is applied to a duplicate name to modify the last character of the name until it is unique.</p> <p>The next pop-up lets you specify what the ListSTAR Server should do when storing files to prevent the Finder from reaching the overflow performance barrier that occurs when more than 100 files are stored in a folder.</p> <ul style="list-style-type: none"> • No Action (the administrator must manually maintain the folders). • Rename folder and create new folder with original name. When the number of files in the folder reaches 100, ListSTAR Server renames the folder by modifying the original name with the current date and time, and creates a new folder with the original name. The new folder is then used for filing mail messages. • Remove files older than 30 days. When the number of files in the folder reaches 100, ListSTAR Server removes all files that are older than 30 days. If there are no files older than 30 days, the overflow condition persists. • Remove oldest 10 files. When the number of files in the folder reaches 100, ListSTAR Server removes the 10 oldest files. From that point, the folder will always contain the 90 most recent files.

TABLE 19 AppleScript Actions

Copy mail file to	Copies the body of the message being processed to a file. Use this action to make the message body accessible to an AppleScript. Check the Copy Mail File To check box and then click the Nothing Selected button to locate and select the file. See <i>Writing an AppleScript to be Executed as an Action</i> .
Execute AppleScript	Executes the selected script. Check the Execute AppleScript check box, then click the Nothing Selected button to locate and select the script. See <i>AppleScript Support</i> for important details.

Rule's Comment

Click the Rule's Comment icon in the rule definition window to write a comment describing the rule. The text field is limited to 255 characters and is intended to contain a short comment about this rule. It's used to document the current rule so future administrators will know what the rule is for. The data in this text field is also included in the Configuration Report, so it could be obtained from that file and used as the basis for a help message returned to users.

Timer Service Rule Definition Interface**Timing Triggers**

Click the Timing Trigger icon to define when actions will occur or to set a Miscellaneous trigger.

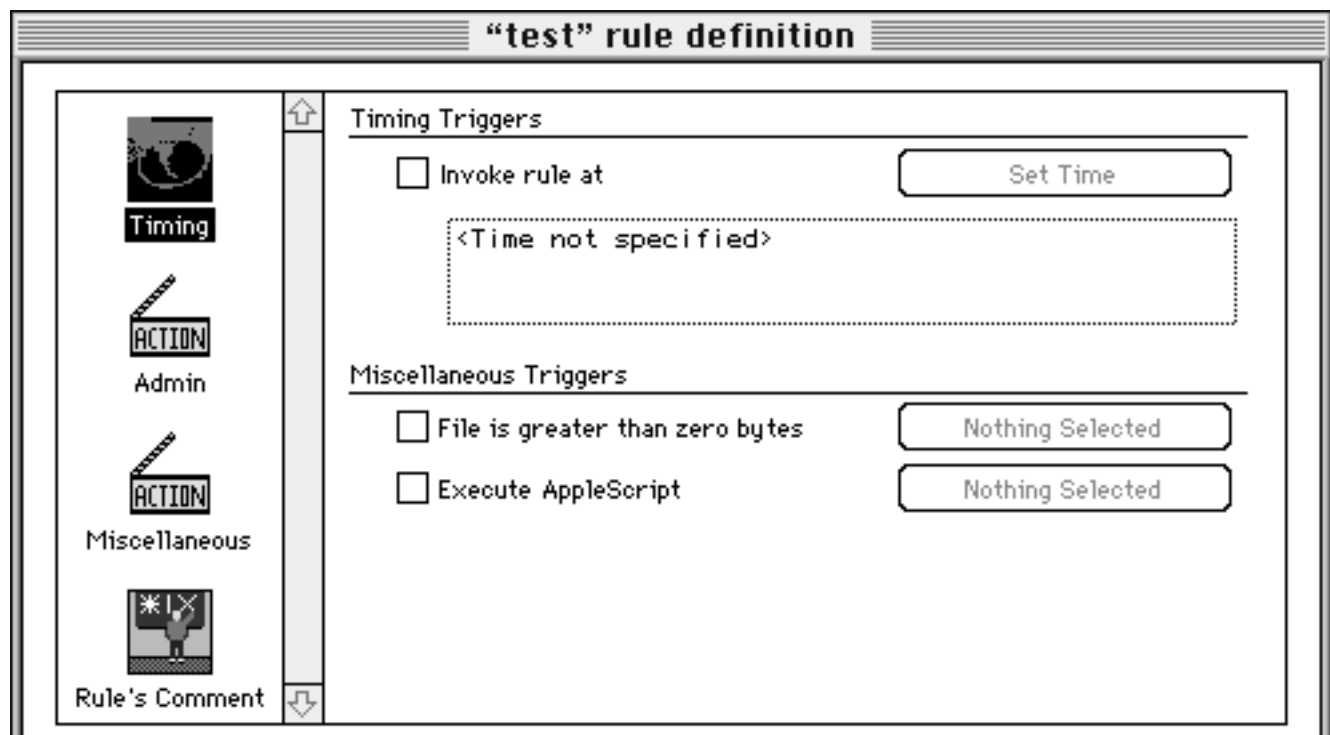


FIGURE 15 Timing Triggers (Timer Service)

TABLE 20 Timing Triggers

Invoke rule at	Sets timing parameters. Check Invoke Rule At and then click the Set Time button to open a dialog box. Click New in the dialog box that opens to open a timing window. Use the up-arrows and down-arrows to modify the selected time field, and then click OK. Click OK in the Invoke rule at... dialog to return to the rule definition window.
----------------	--

TABLE 21 Miscellaneous Triggers

File is greater than zero bytes	This trigger verifies that the selected file is greater than 0 bytes before performing the actions specified in the rule. First, check File Is Greater Than Zero Bytes. Then, click the Nothing Selected button to select the file that will be verified as >0.
Execute AppleScript	This trigger executes the selected AppleScript and succeeds or fails based on its outcome. Check the Execute AppleScript check box, then click the Nothing Selected button to locate and select the script. See <i>Writing an AppleScript to be Executed as a Trigger</i> for important details.

Admin Actions

Click the Admin Action icon in the rule definition window to define actions related to administrative reports and files or actions related to digest files.

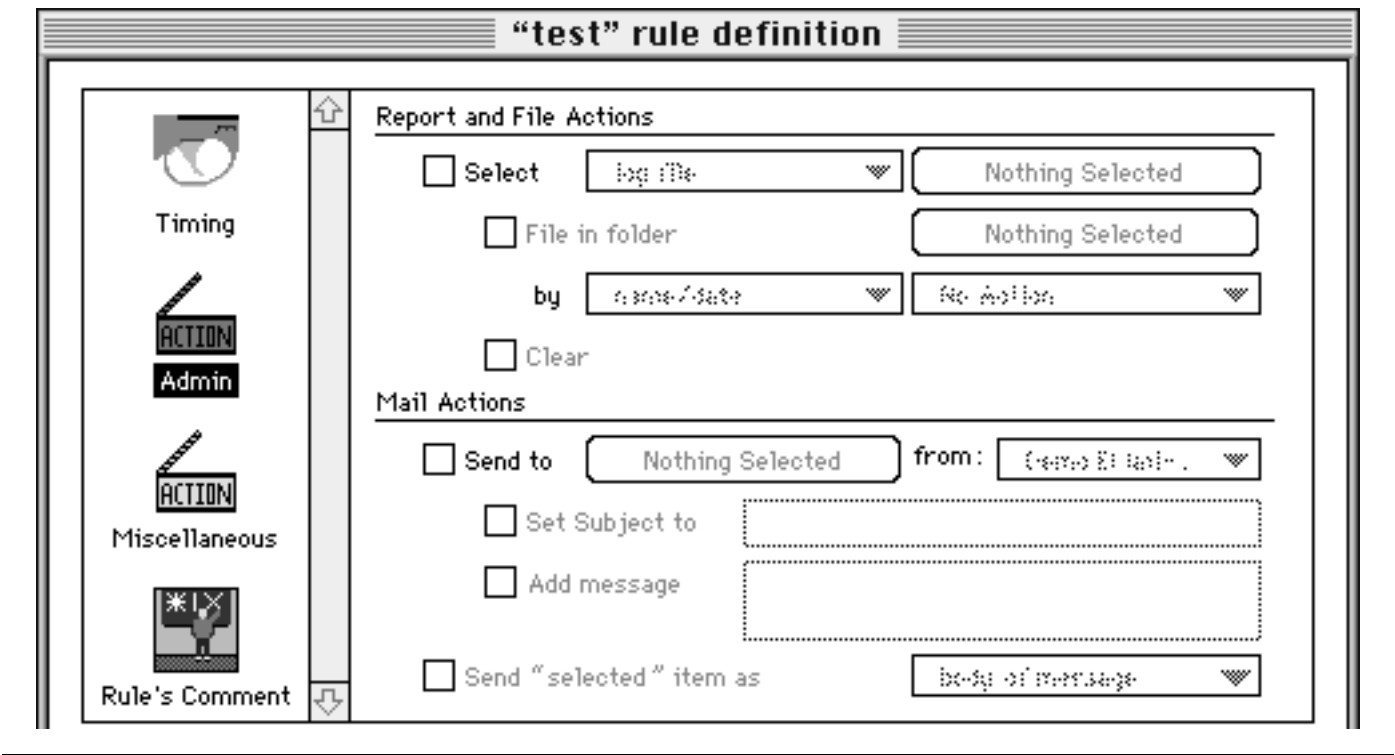


FIGURE 16 Admin Actions (Timer Service)

TABLE 22 Admin Actions

Select file	<p>Lets you select which file or report will be acted upon. These are your choices:</p> <ul style="list-style-type: none"> • Log file (the Log file in the ADMIN folder). • Transaction Log (the Transaction Log file in the ADMIN folder). • Configuration Report. When you select this file, the ListSTAR Server generates a new configuration report into a file named Configuration Report in the ADMIN folder, overwriting the previous file. • Usage Report. When you select this file, the ListSTAR Server generates a new usage report into a file named Usage Report in the ADMIN folder, overwriting the previous file. • Select File. When you choose Select File, the file selection button is activated and you can select any file. <p>For more information about the first four choices in the pop-up, see the Administration service distributed with ListSTAR.</p>
File in folder	<p>Saves the specified file or report in the selected folder. This is often done routinely to file log files or Transactions Logs for historical purposes or access by other applications.</p> <p>Check the File In Folder check box and then click the Nothing Selected button to locate and select the folder. The next pop-up lets you assign a unique filename by choosing one of these options:</p> <ul style="list-style-type: none"> • name/date (the name of the file or report followed by the current date) • name/date/time <p>If a duplicate name occurs, an algorithm is applied to a duplicate name to modify the last character of the name until it is unique. The next pop-up lets you specify what the ListSTAR Server should do when storing files to prevent the Finder from reaching the overflow performance barrier that occurs when more than 100 files are stored in a folder.</p> <ul style="list-style-type: none"> • No Action (the administrator must manually maintain the folders). • Rename folder and create new folder with original name. When the number of files in the folder reaches 100, ListSTAR Server renames the folder by modifying the original name with the current date and time, and creates a new folder with the original name. The new folder is then used for filing mail messages. • Remove files older than 30 days. When the number of files in the folder reaches 100, ListSTAR Server removes all files that are older than 30 days. If there are no files older than 30 days, the overflow condition persists. • Remove oldest 10 files. When the number of files in the folder reaches 100, ListSTAR Server removes the 10 oldest files. From that point, the folder will always contain the 90 most recent files.
Clear	Clears the selected file (zeros out its contents).

TABLE 23 Mail Actions

Send to	Sends the selected file or report to a user or address list. Check the Send To check box and then click the Nothing Selected button to open the Address List Maintenance window, where you can select users and address lists that will receive the file or report. See <i>Selecting Lists in Services</i> .
From	<p>Lets you choose a Mailer service whose account address will be the From address of the message containing the log file. Then, set the subject and specify that the file should be sent as the message body (not an enclosure).</p> <p>▲ Important: The service you choose for the From address must be enabled (checked in the Services window), or the mail message it generates may remain in the spool folder and never be sent.</p>
Set Subject to	<p>Lets you specify the Subject of the message to be sent.</p> <p>❖ Note: You do <i>not</i> need to select a file or report to generate a mail message from this interface. You can just check the Set Subject To box and then type the text you want to use in the text field.</p>
Add message	Uses the specified text as the body of the message. Check the Add Message check box and then type a brief outgoing message. This text is limited to 255 characters and cannot contain any end-of-line characters.
Send selected item as	<p>Lets you specify whether to include the selected file or report in the body of the outgoing message or as a separate file enclosure.</p> <p>▲ Important: The selected file or report will not be sent as part of the mail message unless this option is checked.</p> <p>Check the Send Selected Item As check box and then choose the appropriate item in the pop-up.</p>

Miscellaneous Actions

Click the Miscellaneous Action icon in the rule definition window to define important actions that do not fit into previous categories.

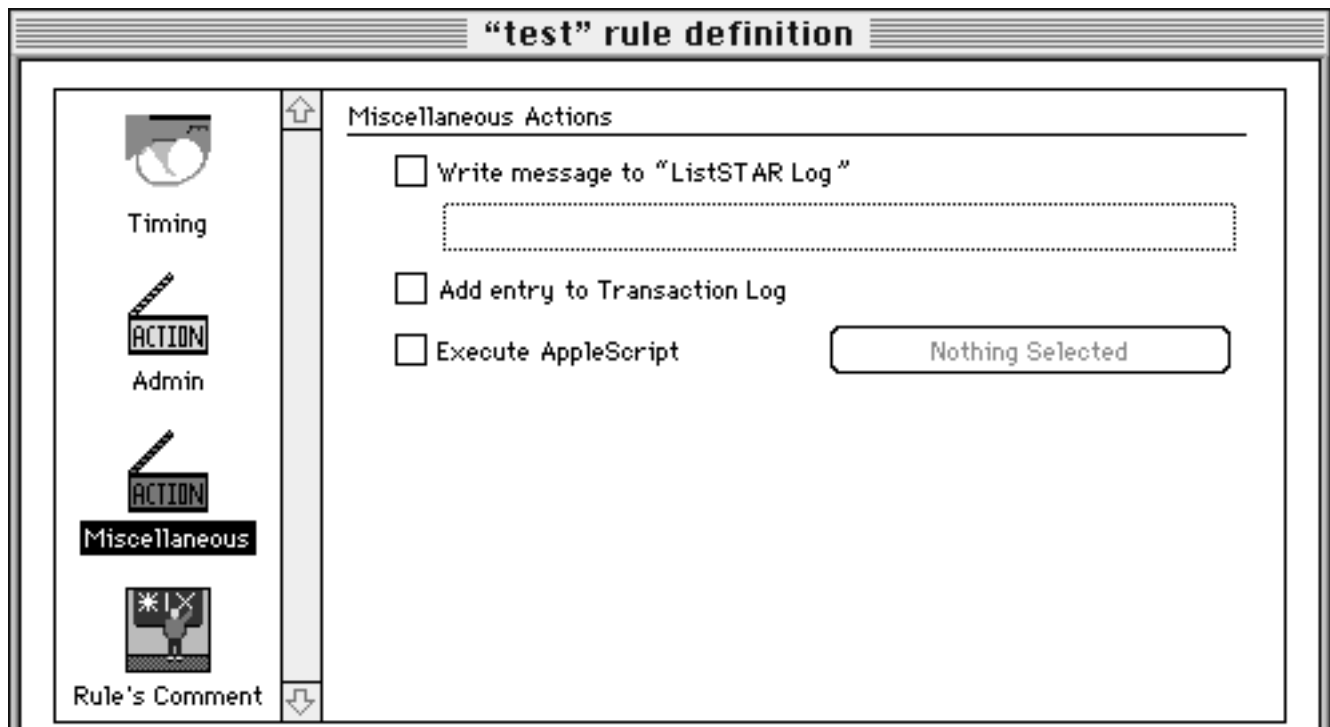


FIGURE 17 Miscellaneous Actions (Timer Service)

TABLE 24 Miscellaneous Actions (Timer Services)

Write message to Log	Writes the specified message to the log. You can use the message to provide debug information, or just as a quick indicator that something has happened. It will be displayed in the log window as soon as this rule is executed. Check the Write Message To Log check box, and then type a brief message in the text field.
Add entry to Transaction Log	Adds a transaction entry to the Transaction Log. A transaction entry includes the date the rule was executed, the name of both the service and rule that executed, the subject of the message, and addressing information about the From address. The Transaction Log is a tab-separated text file that can be imported into other applications such as databases or spreadsheets.
Execute AppleScript	Executes the selected text or compiled script. Check the Execute AppleScript check box, then click the Nothing Selected button to locate and select the script. See AppleScript Support for important details.

Rule's Comment

Click the Rule's Comment icon in the rule definition window to write a comment describing the rule. The comment text field is limited to 255 characters and is intended to contain a short comment about this rule. It is used to document the current rule so future administrators will know what the rule is for. The data in this text field is also included in the Configuration Report.

Status Window

To open a Status window, choose Status in the Windows menu.



FIGURE 18 Status Window

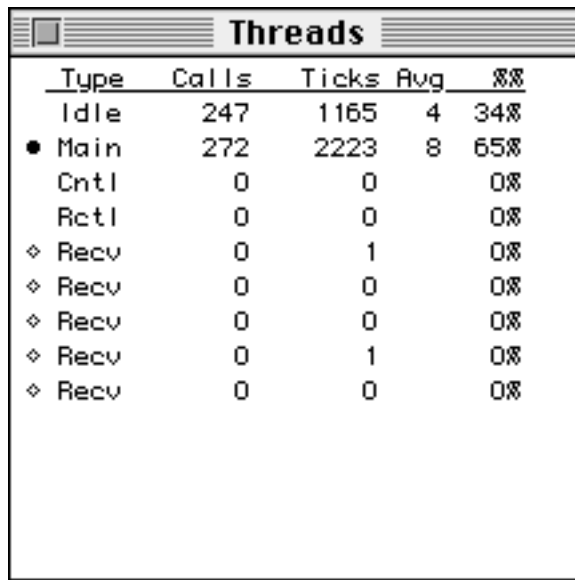
Information in the Status Window

The ListSTAR Server maintains status information about the number of messages queued, sent, and received by the ListSTAR Server, as well as state and memory information. The Status window displays this information and updates it as the information changes. It also has a Suspend Processing button that suspends all ListSTAR Server operations for 15 seconds.

To keep the information in the Status window up-to-date, the ListSTAR Server software counts the number of messages in the queue (inbound and outbound messages) and then updates the Status window with the latest information. You can change how frequently the information is updated and how to handle status updates when there are more than 100 messages in the queue. See the section on Status Window Options in *Status Window Options*.

Threads Window

The Threads window shows the state of all threads, as well as displaying information about Idle time. To open it, choose Threads in the Windows menu.



Type	Calls	Ticks	Avg	%%
Idle	247	1165	4	34%
• Main	272	2223	8	65%
Cntrl	0	0		0%
Rctl	0	0		0%
◊ Recv	0	1		0%
◊ Recv	0	0		0%
◊ Recv	0	0		0%
◊ Recv	0	1		0%
◊ Recv	0	0		0%

FIGURE 19 Dynamically updated Threads Window

Information in the Threads Window

See *Threads Information in the Log File* for additional information about threads. The first column in the Threads window contains one of three characters indicating the state of the thread. A solid bullet character (•) indicates that the thread is active. A hollow diamond indicates that a thread is waiting for an event to occur that will cause it to become active (this is the listener state of the receive threads). A space indicates that the thread is dead. A dead thread will be reactivated when there is an activity for it to perform. The rest of the columns in the Threads window are as follows:

- **Type**
The Type column gives a four character short-hand name for the thread types, explained in *Thread Types*. The first type is not really a thread but is an indication of the idle time of the ListSTAR Server.
- **Number of calls**
The Calls column shows the number of times the thread has been activated.
- **Ticks**
The Ticks column shows the total number of ticks that the thread has been active. (One tick is 1/60 of a second.)
- **Average**
The Avg column indicates the average number of ticks that a thread uses on each activation.
- **Percentage**

The %% column indicates the percent of the time spent in that thread (or overhead/idle). Rounding errors can keep the total from equaling 100%.

Thread Types

The ListSTAR Server has a maximum of 11 threads that may be active at one time. When the administrator specifies a number of incoming connections (between one and five), that number determines how many receive/listener threads are created. The same number of send threads, including the control thread, are created in the thread pool, and one main thread is always present. See *# of Incoming Connections*.

- Main

This thread is the main event loop. It is responsible for overhead activities, including the Preferences interface, key checking, and recognizing when it needs to activate the Control thread. The Main thread is always present and active, and is always assigned the thread ID number 100 in the log file. It is created when the ListSTAR Server is launched.

- Control (Cntl)

This thread is responsible for processing outgoing mail. On outgoing mail, it allocates Send threads (described below) to handle a mail message that is waiting to be sent. If all available send threads are busy, the control thread becomes a sender if there are files waiting to be sent. The Control thread is present and active only when there are outbound mail files that need to be processed. There is only one Control thread. Its thread ID number is assigned only for the current instantiation. When the Control thread stops active processing, its ID number is released and the next ID number ready for assignment is increased by one.

- Receive Control (Rctl)

This thread is responsible for processing incoming mail, including invoking rules processing. Once all outgoing mail has been processed, the Receive Control thread checks to see if any mail has been received by the Recv threads. If so, it processes the inbound mail. The Receive Control thread is present and active only when there are incoming mail files that need to be processed. There is only one Receive Control thread. Its thread ID number is assigned only for the current instantiation. When the Receive Control thread stops active processing, its ID number is released and the next ID number ready for assignment is increased by one.

- Send

This type of thread is responsible for performing the necessary outgoing translation on a mail message (as specified in the per-destination message processing preferences) and then actually sending the mail to the appropriate system via the SMTP protocol. Send threads are present and active only when there are outgoing mail files that are to be processed and sent. The number of send threads in the thread pool is determined by the number of receive threads. Send threads are assigned an ID number only for the current instantiation. When that thread stops active processing, its ID number is released and the next ID number ready for assignment is increased by one.

- Receiver/Listener

These threads listen for an incoming connection request on socket 25 (the SMTP connection socket). When a connection request is received, these threads undertake the SMTP protocol that is necessary to receive one (or more) mail messages from the initiating host. The actual processing of a received message is done by the Control thread, described above. Receive threads are always present. The number of these threads that are present is controlled via the Preferences panel and may range from one to five—see *# of Incoming Connections*. Receive threads are assigned a thread ID number beginning with 101.

Address Lists Interface

Address List Maintenance Window

The Address Lists command in the Windows menu lets you view and modify ListSTAR address lists. (A *User List* is an address list type that contains exactly one address.) The services that reference each list are also shown in this window:

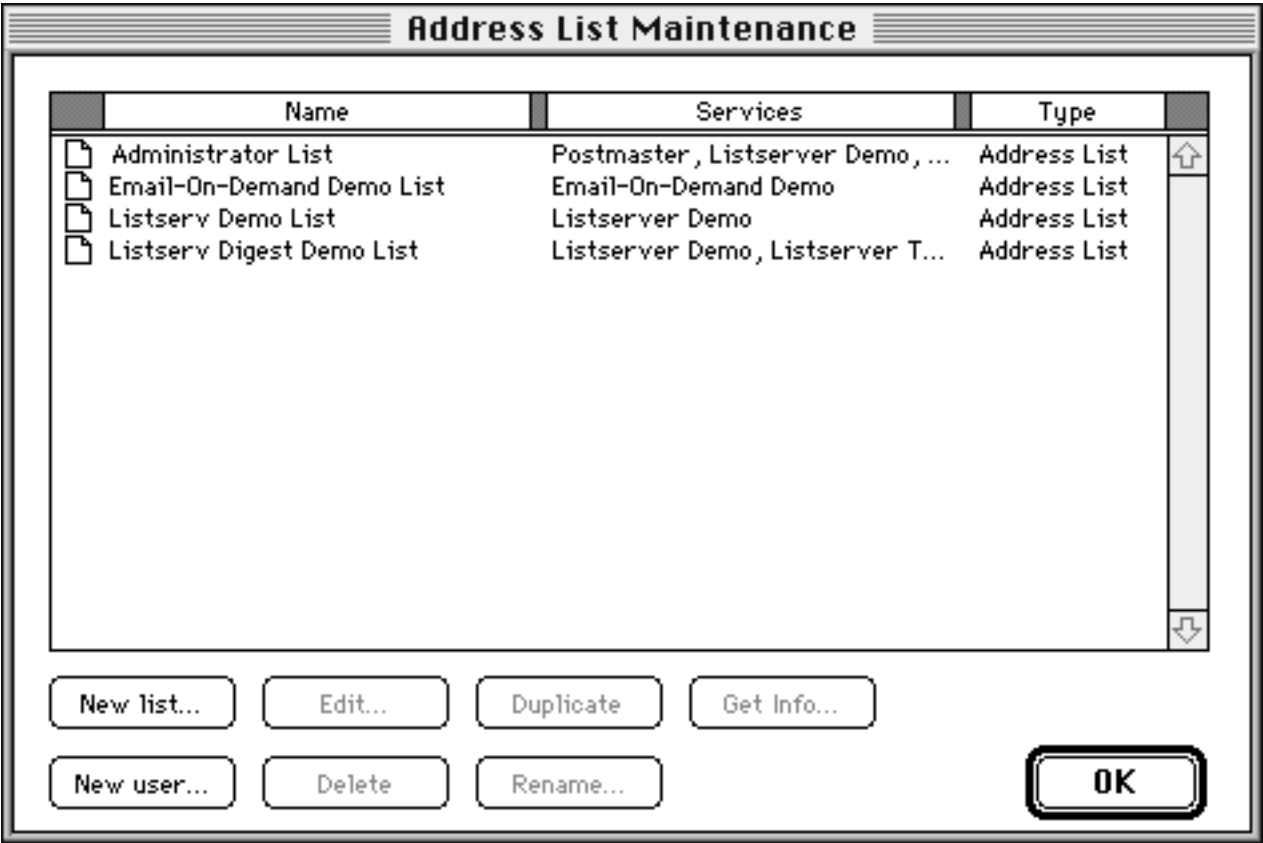


FIGURE 20 Address Lists

The columns in the Address List Maintenance window show the Name of each list, the Services that select the list, and the Type of the list (*Address List* or *User*).

The buttons in Address List Maintenance window let you work with address lists. Except for the New List and New User buttons, the buttons operate on *all* highlighted items. If multiple items are selected, the given operation will be performed on each selected item sequentially. The buttons provide the following functions:

TABLE 25 Buttons in the Address List Maintenance Window

New list	Opens a dialog in which you can specify a name for a new address list.
New user	Opens a dialog in which you can specify a name for a new user.

TABLE 25 Buttons in the Address List Maintenance Window (Continued)

Edit	Opens the list, where you can change entries (or fields in a user list). This is the equivalent of double-clicking on a list item.
Delete	Deletes the highlighted address list. CAUTION: Deleting an address list associated with an existing service will cause unpredictable results!
Duplicate	Creates a copy of an address list. Initially, the duplicate is given the same display name as the original. Display names are “virtual” names that exist only within the ListSTAR Server interface.
Rename	Opens a dialog where you can assign a new display name to the list. You should assign display names that indicate which services will use it.
Get Info	Opens a read-only window that shows a list of all services that use the highlighted service, as well as its real file name. See <i>Getting More Information About a List</i> for more details.

Creating and Editing Lists

To create an address list, click New List at the bottom of the window. You will be prompted to enter a name.



FIGURE 21 Creating a new address list

You can give a list any name that is 31 characters or less. When you click OK, the name is added to the list of address lists. At this point, the list is empty.

Modifying an Address List

To manually add users to an address list or delete users from a list, double-click the list or highlight the address list and click the Edit button. The Modify Address List window opens.

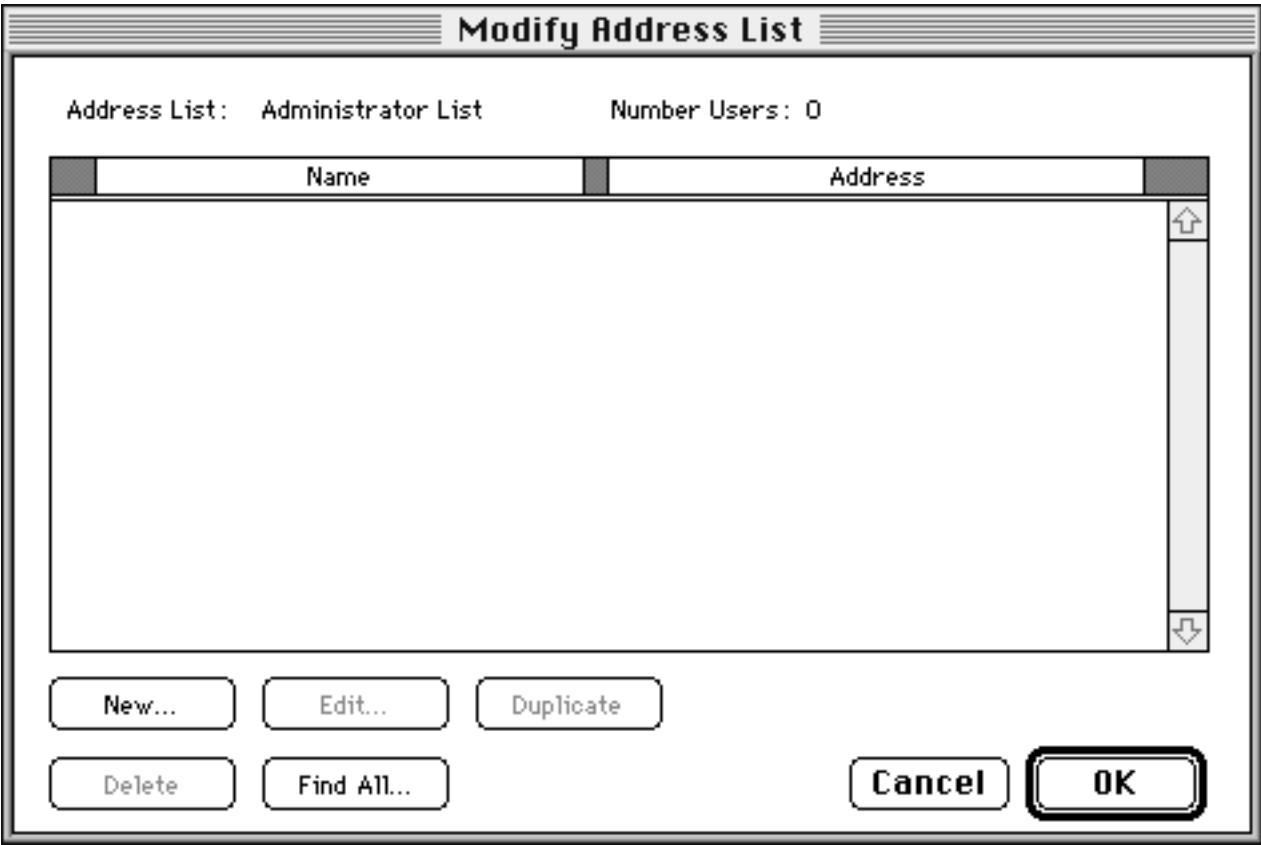
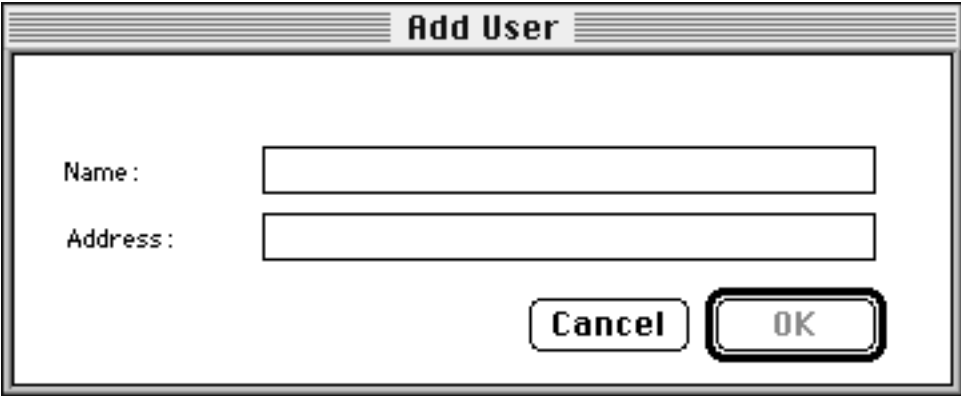


FIGURE 22 Modify Address List

The buttons in the Modify Address List window lets you work with users. Except for the New button, the buttons operate on all of the highlighted items. If multiple items are selected, the given operation will be performed on each selected item sequentially. The buttons provide the following functions:

TABLE 26 Buttons in the Edit Address List Window

New	Opens the Add User dialog shown in FIGURE 23, in which you can specify a user’s name and address. You can also use copy and paste users from one list to another.
Edit	Opens a similar dialog where you can modify the user’s name or address. This is the equivalent of double-clicking on a user entry in the list.
Duplicate	Creates a copy of the user entry. The duplicate has the same name and address as the original.
Delete	Deletes the highlighted address user entry.
Find All	Opens a dialog in which you can specify text to search for in the name or address field.



The 'Add User' dialog box features a title bar with the text 'Add User'. Inside, there are two text input fields. The first is labeled 'Name :' and the second is labeled 'Address :'. At the bottom right of the dialog, there are two buttons: 'Cancel' and 'OK'.

FIGURE 23 Adding a user

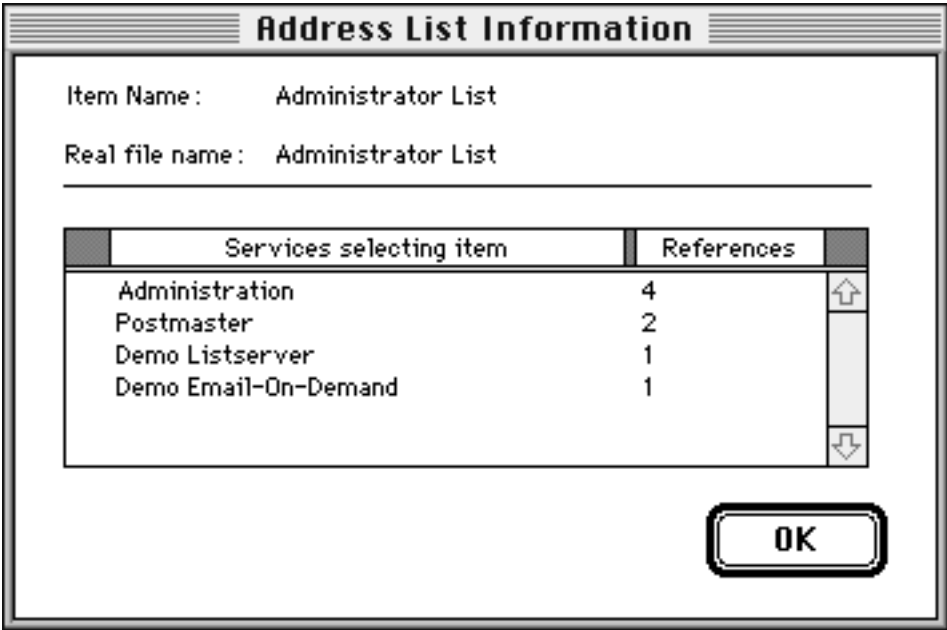
To add the user’s address to the list, fill in the fields appropriately and click OK.

Creating a User

To create an address list of type User, open the Address List Maintenance window and click New User. The Add User window is just like the one shown in FIGURE 23. To create the User address list, fill in the fields appropriately and click OK. The text you enter in the Name field will be the list’s display name, and the list type will be User.

Getting More Information About a List

The Get Info button opens a window that shows the list’s display name (“Item name”) and real file name in the Address Lists or User Lists folder. Each address list or user list is one file in the Address Lists or User Lists folder within the ADMIN folder. The window also shows the names of services that have selected the list, and the number of times the list has been selected in each service’s triggers and actions (“References”).



The 'Address List Information' dialog box displays details for an 'Administrator List'. It shows the 'Item Name' and 'Real file name' as 'Administrator List'. Below this is a table with two columns: 'Services selecting item' and 'References'. The table lists four services: Administration (4 references), Postmaster (2 references), Demo Listserver (1 reference), and Demo Email-On-Demand (1 reference). To the right of the table is a vertical scrollbar. An 'OK' button is located at the bottom right of the dialog.

Services selecting item	References
Administration	4
Postmaster	2
Demo Listserver	1
Demo Email-On-Demand	1

- ▲ **Important:** Don't change the name of the files within the Address Lists or User Lists folders. Instead, use the address list interface to assign meaningful display names. Changing filenames can cause unpredictable results in services referencing the address list.

Selecting Lists in Services

You can open a window to select address lists within a window as follows:

- Mailer Service Address Trigger: You can verify that a user's address is (or is not) present in selected lists.
 - Mailer Service Mailing-list Action: You can forward a message to members of selected lists and add or delete a user's address to or from selected lists.
 - Timer Service Admin Action: You can send a file or report to members of selected lists.
- ▲ **Important:** In some of these service contexts, it doesn't make sense to include user lists. For example, you can't delete an address from a user list. In those contexts, only lists of type Address List will be displayed.

In each of these configuration panes, you click a button labeled Nothing Selected to open this window:

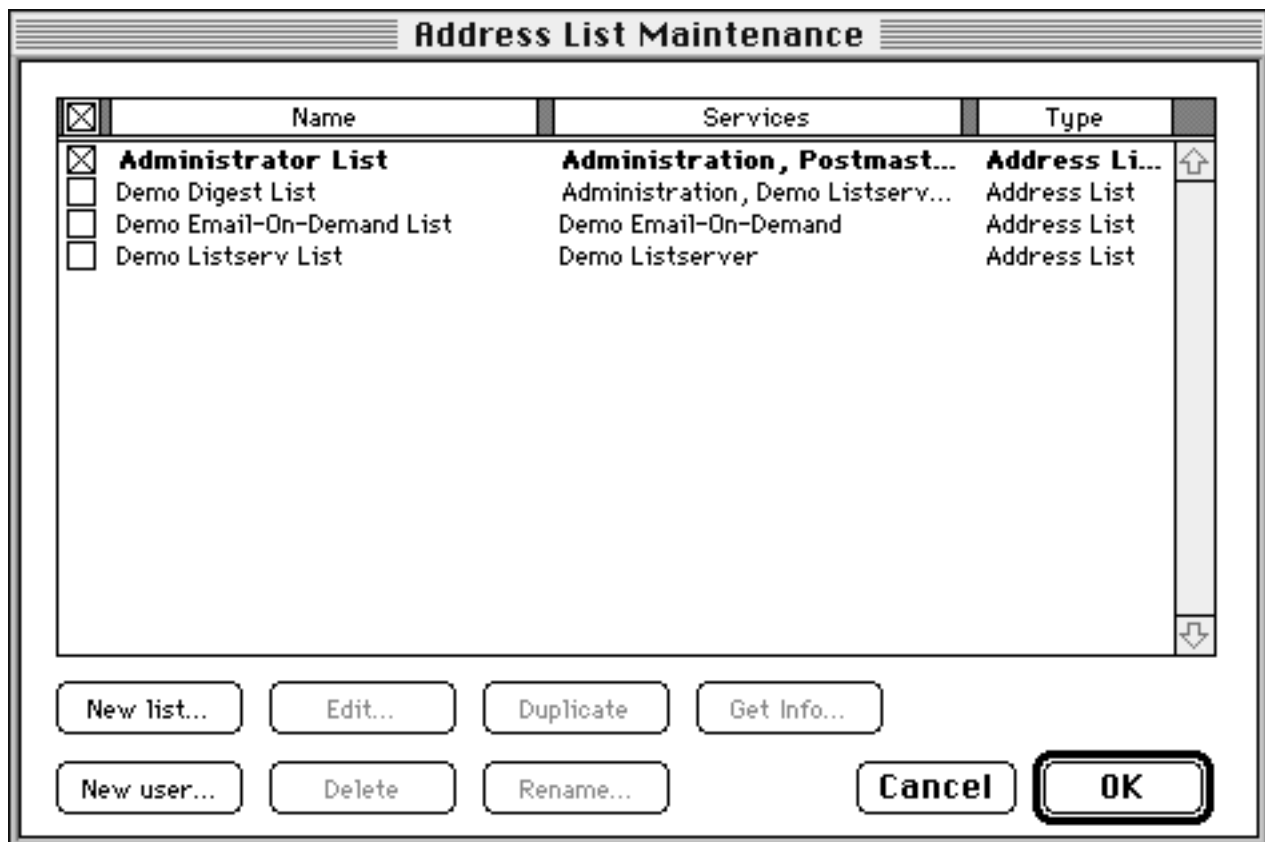


FIGURE 24 Selecting an address list within a service

At least one list must be selected to enable the OK button. Click in the check box to select a list. Selected lists are checked and displayed in bold type. If one list is selected, the name of that list appears in the button in place of Nothing Selected. If two lists are selected, the button will say "2 address lists," and so forth for any number of lists.

Check Pending Mail Window

The ListSTAR Server stores messages in the Message Spool folder within the ListSTAR folder. The files in that folder have been processed by the ListSTAR Server and are stored in a format for efficient processing, not for readability by an administrator. Instead of working with those files, you should work with the queue by opening the Check Pending Mail window in the ListSTAR Server.

Queued Messages

To open a window on the queue, choose Check Pending Mail in the Windows menu. You'll see a listing of queued messages like this:

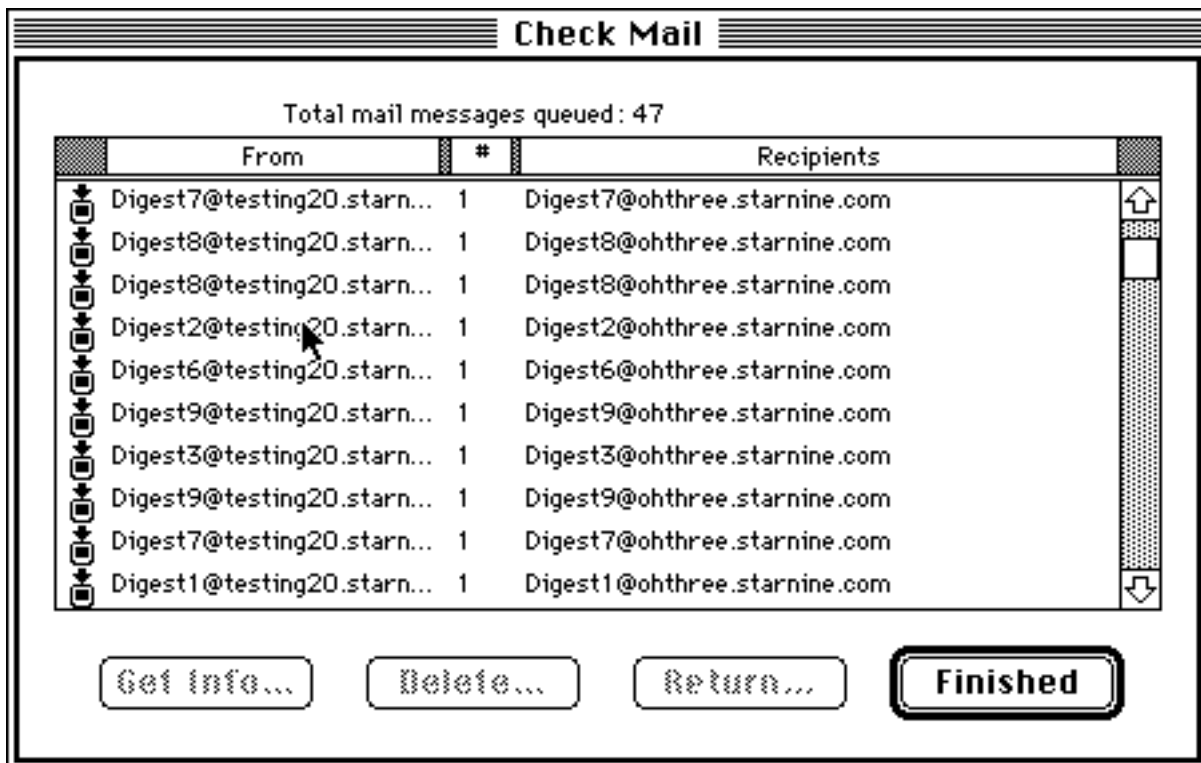


FIGURE 25 Check Pending Mail

Each message occupies one line in the queue window. The symbols preceding a message are as follows:

- A downward pointing arrow indicates an incoming message (the mail has not been processed by a service).
- An upward pointing arrow indicates an outbound message.
- An X through either a downward or upward pointing arrow indicates a delivery problem.

The columns in the Check Pending Mail window show the From address (the address of the sender), the number of recipients, and a comma-separated list of the recipients.

The buttons in Check Pending Mail window let you work with queued messages. The buttons operate on all of the highlighted items. You can press Command-a to select all messages or Shift-click to select certain

messages. If multiple items are selected, the given operation will be performed on each selected item sequentially. The buttons provide the following functions:

TABLE 27 Buttons in the Check Pending Mail Window

Get Info	Opens a dialog in which you can see the full list of recipients as well as more detailed information about the spooled file, including the name of the file, the last time a connection was established, the date the message was sent, and the number of bytes in the message.
Delete	Deletes the message from the queue.
Return	Return messages to the sender. You will be asked to confirm that you want to return each message. To avoid these repeated alerts when returning more than one message, press the Option key when you click Return.
Finished	Closes the queue window.

General Preferences Interface

To open the General Preferences interface, choose General Preferences in the Windows menu. This window opens:

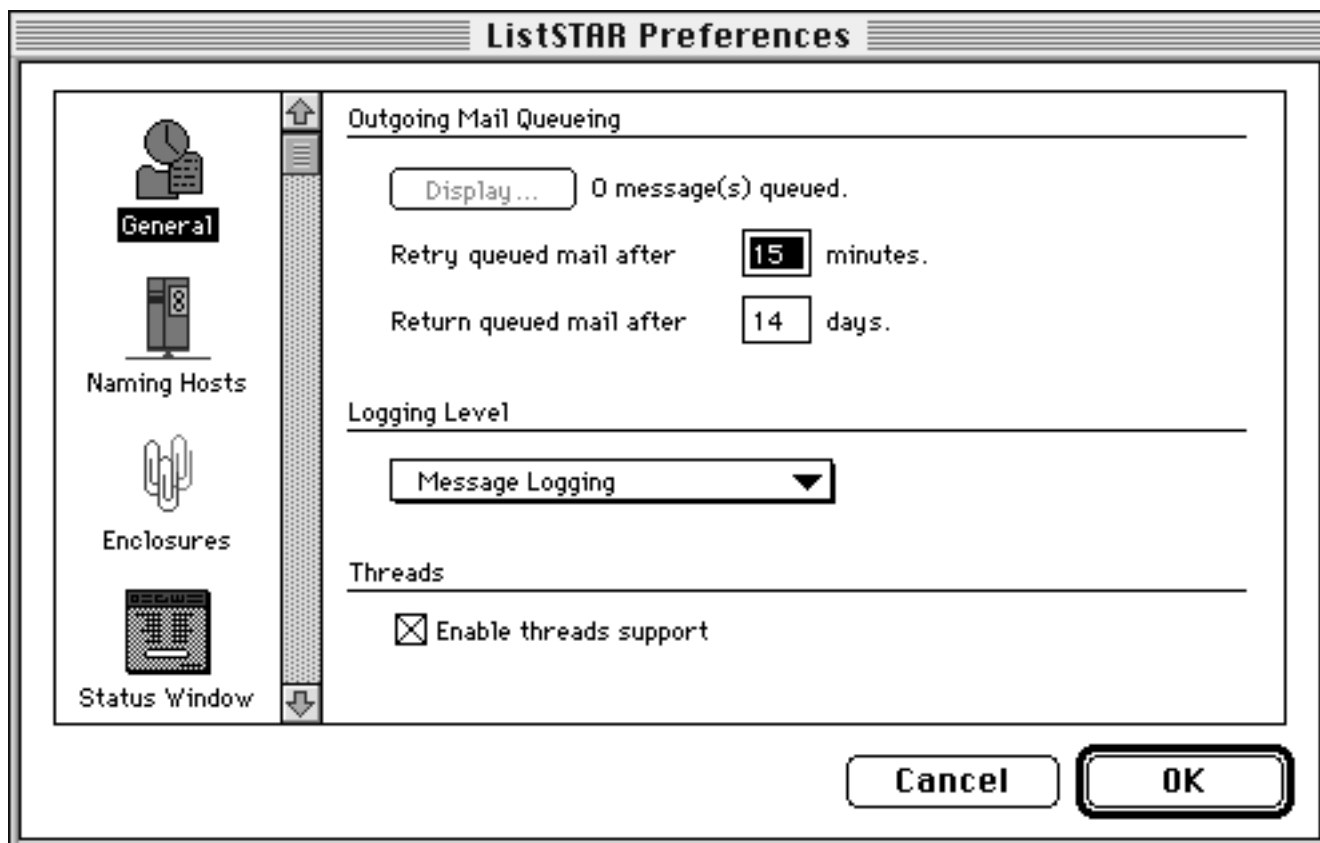


FIGURE 26 General Preferences Interface

Selecting an icon in the left column (the item list) of the Preferences dialog opens a group of related configuration options. If you configure the options related to one icon and then select another icon, the changes you made are saved automatically. You don't need to click OK each time—clicking OK saves all changes and closes the window.

Clicking Cancel closes the window without saving any changes. However, if you have already opened a subdialog and saved changes within that window, clicking Cancel at the top level of the Preferences window does not cancel out those changes.

The following keyboard shortcuts are recognized in the Preferences dialog:

- Enter or Return selects the default button (the button with a double border).
- Command-period selects the Cancel button.

- Select an item in the left column (the item list) by pressing the Command key and the item's position in the list (Command-1, Command-2, and so forth).
- Select a button within an options window by pressing the Command key and the first character of the button's name (for example, press Command-d to select the Display button in the initial window).

General Options

The General icon at the top of the left column is selected by default when you open the Preferences dialog. In this window, you can control the kind of messages that will be written to the log and work with the queue of inbound and outbound messages.

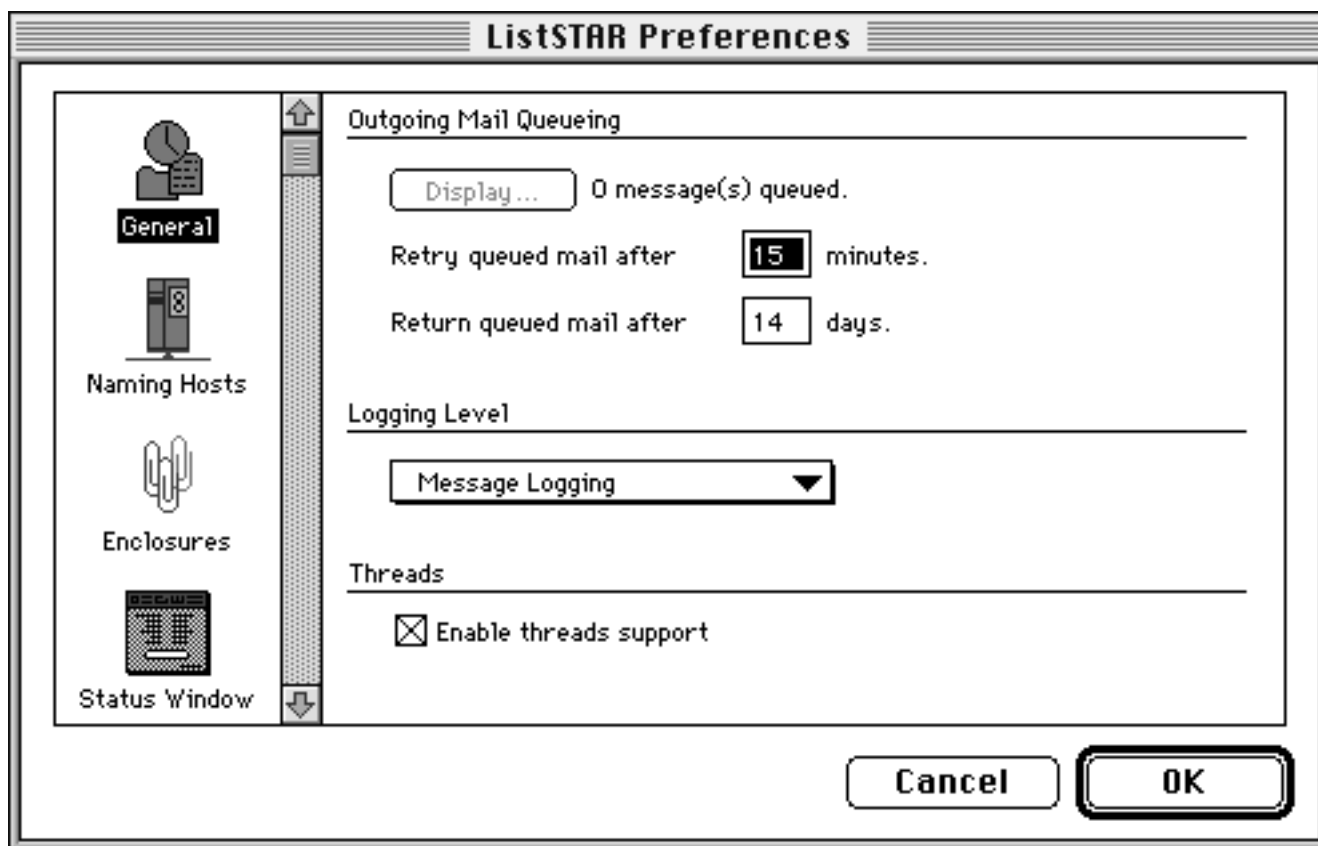


FIGURE 27 General Options

TABLE 28 General Options

Display

If there are no messages in the queue, the Display button is dimmed. Otherwise, the button is active and the number of messages in the queue is displayed to the right of the button. When you click the Display button, you open the same interface opened by selecting Check Pending Mail in the ListSTAR Server's Administration menu. See *Check Pending Mail Window* for details.

TABLE 28 General Options (Continued)

Retry queued mail	This option specifies how to handle mail that cannot be delivered on the first attempt. By default, it retries every 15 minutes. After the amount of time specified in the Return queued mail configuration (below), it gives up and returns the mail to the sender. You can change how frequently the ListSTAR Server attempts to redeliver mail by typing a different number in the text field. For example, on a very busy network you may want to enter a higher number, such as 30 or 60. If you enter 0 in the text field, the ListSTAR Server will not attempt to redeliver mail after one failed attempt. This is not generally recommended.
Return queued mail	<p>This option tells the ListSTAR Server when to stop trying to deliver a message and return it to the sender with a message that the mail was not delivered. By default, it stops trying after one day.</p> <p>You can change how long the ListSTAR Server waits before returning undeliverable mail by typing a different number in the text field. If you enter 0 in the text field, the ListSTAR Server will not return undelivered mail to the sender. This is not generally recommended.</p>
Changing the Default Log Level	You can use the Logging Level pop-up to specify a different log level as the default to be used by the ListSTAR Server in this and subsequent sessions. This menu contains the same items as the Set Log Level hierarchical menu in the Administration menu. See <i>Administration Menu</i> .
Enabling Threads Support	The ListSTAR Server can function in a threaded or non-threaded environment. See <i># of Incoming Connections</i> for related issues. Uncheck the Enable Threads Support check box to run in a non-threaded environment.

Naming Hosts

The basic network setup requires that you supply a host name (My Hostname) and default mail host name (Default Mail Host). If you have not already done so, see *Getting Started*.

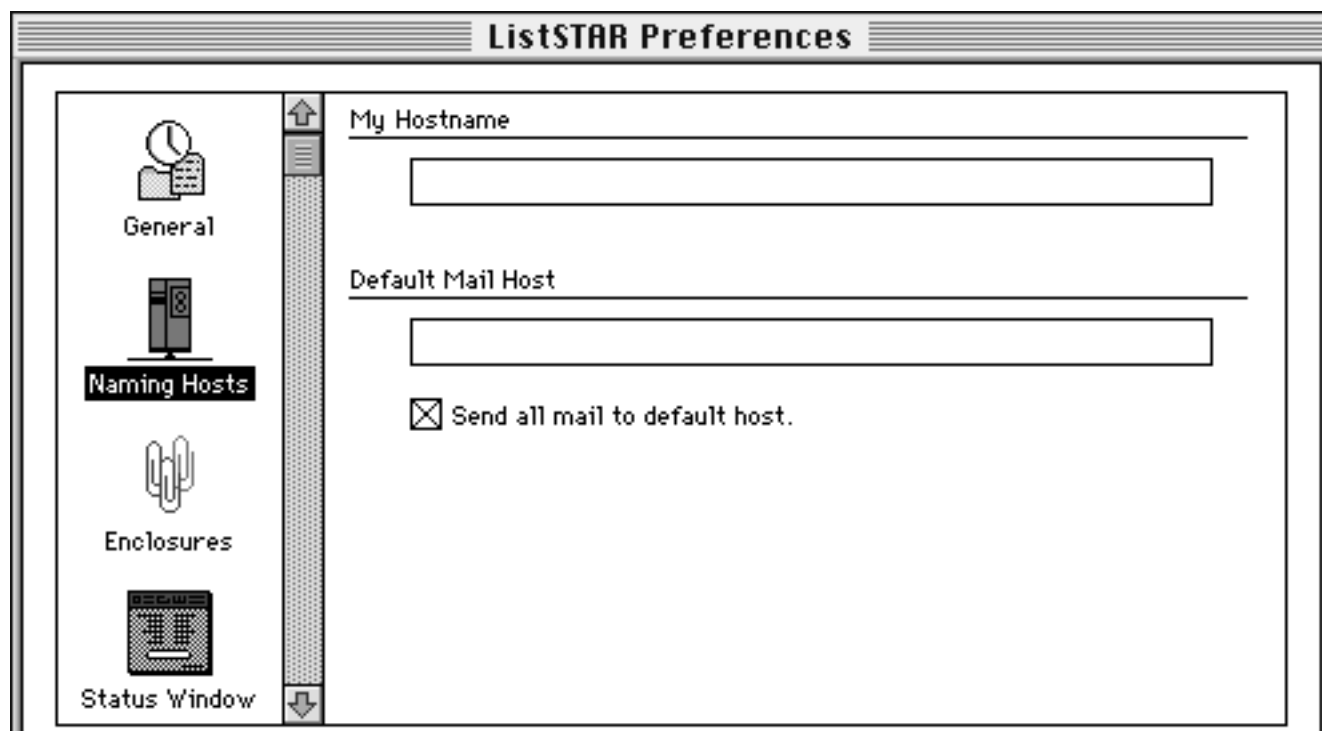


FIGURE 28 Host Name Options

▲ **Important:** Hostnames must be provided by the IP network administrator.

TABLE 29 Naming Hosts

My Hotsname	This field must contain the hostname (which may include the domain name) for the ListSTAR Server on the TCP/IP network. It must be unique in the local domain. For example: liststar.abc.com
Default Mail Host	This field must contain the hostname of a mail host on the local TCP/IP network. Type the hostname of the default mail host. For example: sparky.abc.com
Send All Mail to Default Host	<p>When Send All Mail To Default Host is checked (the default), all outbound mail is sent to system specified as the default mail host. This is the recommended setting for most servers.</p> <p>If you uncheck this option and the destination host name is a known system (that is, the ListSTAR Server is able to obtain the system's IP address from the Hosts file or from the domain name server), the ListSTAR Server attempts to open a direct connection to the target system. If the target system is unavailable, the mail is requested for future handling. Mail addressed to an unknown system is always forwarded to the default mail host.</p>

Message and Enclosure Processing

For translation tables and other details, see *Details About Enclosure Processing*. If you *don't* set enclosure processing options, ListSTAR Binhexes outbound Macintosh enclosures and places no limit on the enclosure

size. No translations are made on the body text of messages. To change these defaults, click the Enclosures icon.

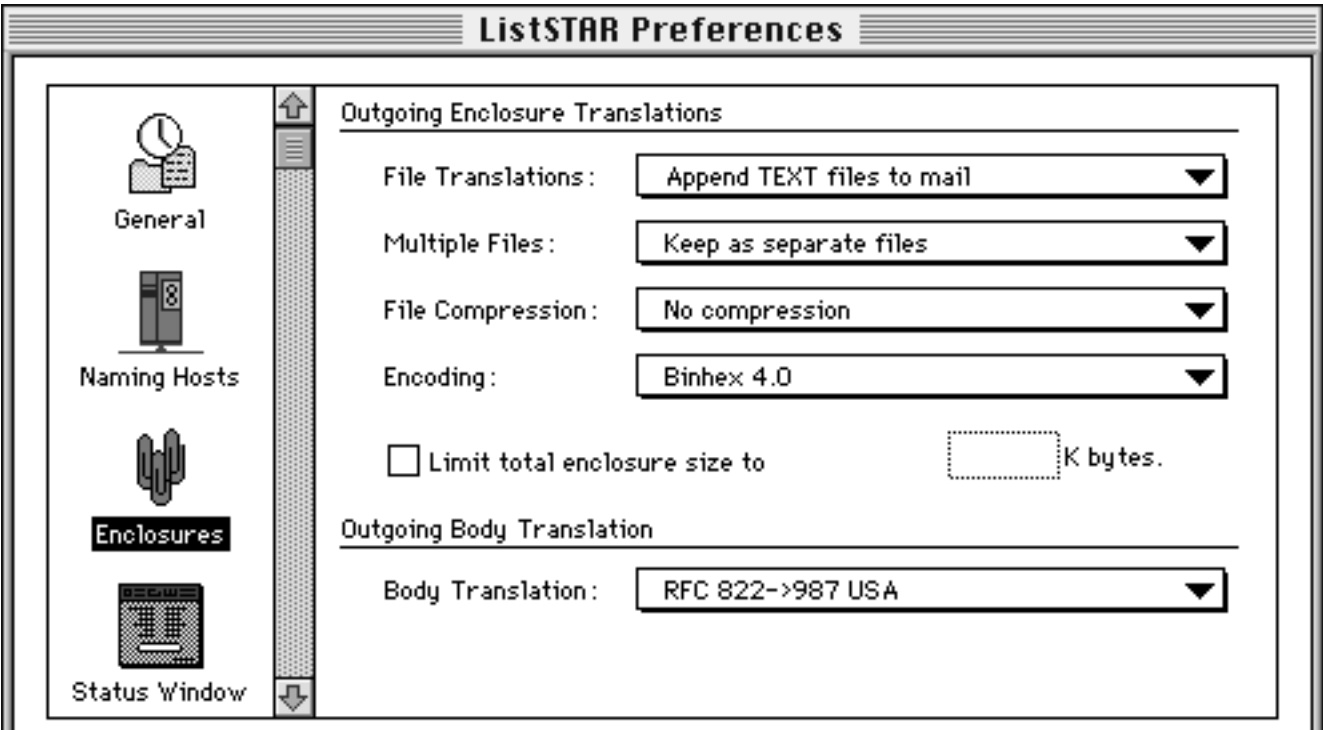


FIGURE 29 Enclosures Options

▲ **Important:** The options you set in this window apply to *all outgoing* messages and enclosures. So, you must select enclosure handling options that are appropriate for the majority of outbound messages.

File Translations

Click the File Translations pop-up to view options related to text file processing.

File translations are performed based on the file type. At this release, most of these options relate to files of type TEXT. Macintosh files that are plain text, such as any file saved as Text Only, have of type TEXT. When the ListSTAR Server is sending text files, the main concern is whether the recipient system supports MIME and whether the file itself contains 8-bit Macintosh characters (such as ð or Ç) that might not be understood by a UNIX or PC system.

TABLE 30 File Translation Options

None	Do not apply a translation method based on file type.
Append TEXT Files to Mail	If the file type is TEXT, append the file to the message body. The translation method specified for body text will be applied before the message is sent. <i>This is the recommended translation method for sites that don't support MIME.</i>

TABLE 30 File Translation Options (Continued)

Append Verified TEXT Files to Mail	If the file type is TEXT, scan the first 2048 bytes of the file to verify that no control characters are found before appending the file to the message body. The translation method specified for body text will be applied before the message is sent. If control characters are found, the file will be treated as a binary file and passed to subsequent steps. <i>This is the recommended translation method for recipients that use QuickMail for Windows or QuickMail for DOS.</i>
Text to Plain Text—MIME	If the file type is TEXT, insert it in the message as is (8 bit or 7 bit).
Text to ISO-8859-1 Text—MIME	If the file type is TEXT, convert the characters in the file to ISO-8859-1 before inserting it into the file as is (8-bit or 7-bit). For incoming files, decode from the ISO-8859-1 character set to Macintosh characters. See <i>ISO 8859-1 Translation Tables</i> for more information.
Text to Quoted-Printable Text—MIME	If the file type is TEXT, use the MIME quoted-printable format that allows 8-bit characters and inserts line breaks every 76 characters. For incoming files, decode from MIME. See <i>Quoted-Printable MIME</i> for details.
Text to Quoted-Printable ISO-8859-1 Text—MIME	<i>This is the recommended translation method for recipients that support MIME.</i> If the file type is TEXT, convert the characters in the file to ISO-8859-1 before converting the file into quoted-printable format. For incoming files, decode MIME and decode from the ISO-8859-1 character set to Macintosh characters. See <i>ISO 8859-1 Translation Tables</i> and <i>Quoted-Printable MIME</i> for details.
File Type to PC Extension	<i>This is a useful translation method when sending to a site that supports PCs.</i> Examine the file type of the enclosure and map it to an appropriate DOS filename extension. For example, text files will be assigned the extension .TXT, and Excel files will be assigned the extension .XCL. For incoming files, examine the 3-character filename extension and map it to the appropriate Macintosh type and creator. See <i>File type to PC Extension Mapping</i> for details.

Multiple File Enclosures

Click the Multiple Files pop-up to choose how multiple file enclosures will be handled.

TABLE 31 Multiple File Enclosure Handling

Keep as separate files	<i>This is the recommended setting.</i> Do not combine multiple files. Each file is handled separately according to the other options; for example, text files are processed according to the <i>File Translations</i> option and binary files are encoded separately using <i>Binary File Encoding</i> setting.
PACKIT format	Combine multiple file enclosures in a compressed PACKIT format. Only one enclosure is sent. The encoding method specified in <i>Binary File Encoding</i> will be applied before the message is sent.

File Compression Methods

Click the File Compression pop-up to choose a file compression method. If you have version 3.07 or later of the StuffIt™ Engine in the Extensions folder within the System Folder, you can select StuffIt compression.

When selected, the ListSTAR Server creates a single archive and compresses all outbound file enclosures in that archive. It then creates a resource item that stamps the archive as one created for e-mail purposes only.

- ❖ **Note:** The ListSTAR Server will expand only StuffIt archives that are stamped with the appropriate resource item (that are known to be created for e-mail purposes only).

Binary File Encoding

Click the Encoding pop-up to choose an encoding method for binary file processing.

Macintosh files are binary files, such as an application or another type of Macintosh-specific file. These files may contain data that can be shared with other types of systems (the data fork) and Macintosh resource information (the resource fork). These files have a TYPE other than TEXT; for example, if a Word file contains binary formatting information, a TYPE field of WDBN informs the Word application to display formatted text.

Your main concern when sending binary files is whether the recipient system supports MIME and whether that system will be able to use the Macintosh-specific information.

TABLE 32 Binary File Encoding Options

AppleSingle— UUENCODE	Add the Finder information into the resource fork. Then, combine the resource and data forks into a single file and encode that file using UUENCODE. <i>This is a useful encoding method for sending Macintosh-specific files when you are not sure if the recipient system is a Macintosh.</i>
Binhex 4.0	Encode the file using the BINHEX method. This is the most widely available and widely used encoding method for Macintosh files. <i>This is the recommended method for sending Macintosh-specific or application files to Macintosh recipients.</i>
Datafork Only—UUENCODE	If the enclosure has a resource fork, the ListSTAR Server discards it and then encodes the data fork by using the UUENCODE method. <i>This method is recommended for encoding files sent to older UNIX systems and PCs.</i>
MacBinary— UUENCODE	Preserve both the resource and data forks of a binary file and encode it using UUENCODE. <i>This method is recommended for PC networks running Microsoft® Mail.</i>
AppleSingle— MIME	Add the Finder information into the resource fork. Then, combine the resource and data forks into a single file and encode the file in base 64. Non-Macintosh recipients will be unable to read the file, and audio or graphic elements may not be usable. If you use the recommended AppleDouble-MIME and recipients tell you they couldn't read the file, try this option.
AppleDouble— MIME	Preserve both the resource and data forks as separate file components and encode them in base 64. <i>This is the accepted industry standard for transmission of Macintosh files via MIME and is the recommended option for recipients that support MIME.</i>
Datafork Only—MIME	Drop the resource fork of the file and then encode the remaining data fork in base 64. Audio or graphics, such as those in GIF format, are part of the data fork and are not lost, but may not be usable. If the recipient system or gateway cannot decode AppleDouble format, you can select this option.

Setting Limits on Total Enclosure Size

This option allows you to control the total size of enclosures sent by the ListSTAR Server.

- ❖ **Note:** The limit specified here is for the total size before encoding. In general, encoding will increase the size of the data sent by about a third.

If you do not wish to place a limit on the enclosure size, leave the item unchecked. If you do wish to place a limit, check the box and then specify the maximum enclosure size in 1024-byte multiples. If you check this option and specify a limit, mail that contains more enclosure data than allowed by this limit will be returned to the Macintosh user who originated the mail.

Message Body Translations

The Macintosh character set includes many special characters such as • or 🍏, which require a full 8 bits to be represented. If a system that uses the eighth bit for another purpose receives a message that contains these characters, it displays them as garbage characters. To avoid this problem when communicating with non-Macintosh recipients, you should select a translation method for body text.

To choose a body translation method, open the Body Translation pop-up menu. The options in this menu affect how Macintosh 8-bit characters will be translated in the message body. By default, the characters are translated into 7-bit representations; for example, © is translated to (c).

TABLE 33 Message Body Translation Options

None	Do not perform any translations on the body text. <i>IMPORTANT: The receiving system and all intermediary transport systems must be completely 8-bit clean.</i>
Quoted-Printable— MIME	Use the MIME quoted-printable format that allows 8-bit characters and inserts line breaks every 76 characters. For incoming messages, decode from MIME. See <i>Quoted-Printable MIME</i> for details.
Quoted-Printable ISO-8859-1—MIME	<i>This is the recommended translation method for recipients that support MIME.</i> Convert the characters in the message to ISO-8859-1 before converting into quoted-printable format. For incoming messages, decode from MIME and from the ISO-8859-1 character set to Macintosh characters. See <i>ISO 8859-1 Translation Tables</i> and <i>Quoted-Printable MIME</i> for details.
ISO-8859-1—MIME	Convert the characters in the message to ISO-8859-1 before processing them as is (7-bit or 8-bit). For incoming messages, decode from the ISO-8859-1 character set to Macintosh characters. See <i>ISO 8859-1 Translation Tables</i> for details.
RFC 822->987 USA	Translate illegal characters in addresses and body text as required by RFC 822. <i>This is the recommended setting for older recipient systems.</i>
Transparent 8-bit	Leave the message body alone except for control characters other than tab, newline, and carriage return. <i>IMPORTANT: The receiving system and all intermediary transport systems must be completely 8-bit clean.</i>
ISO-8859-1	Convert Macintosh characters to the ISO-8859-1 character set. <i>IMPORTANT: The receiving system and all intermediary transport systems must be completely 8-bit clean</i> See <i>ISO 8859-1 Translation Tables</i> for details..

TABLE 33 Message Body Translation Options (Continued)

- 2 way ISO-8859-1 Convert Macintosh characters to the ISO-8859-1 character set in outbound messages and from ISO-8859-1 to Macintosh characters in inbound messages. **IMPORTANT:** *The receiving system and all intermediary transport systems must be completely 8-bit clean. See ISO 8859-1 Translation Tables for details.*

Status Window Options

You can open a Status window that shows this information at any time by choosing Status in the Windows menu. Or, you can configure a general preferences option to open a Status window automatically whenever the ListSTAR Server is launched.

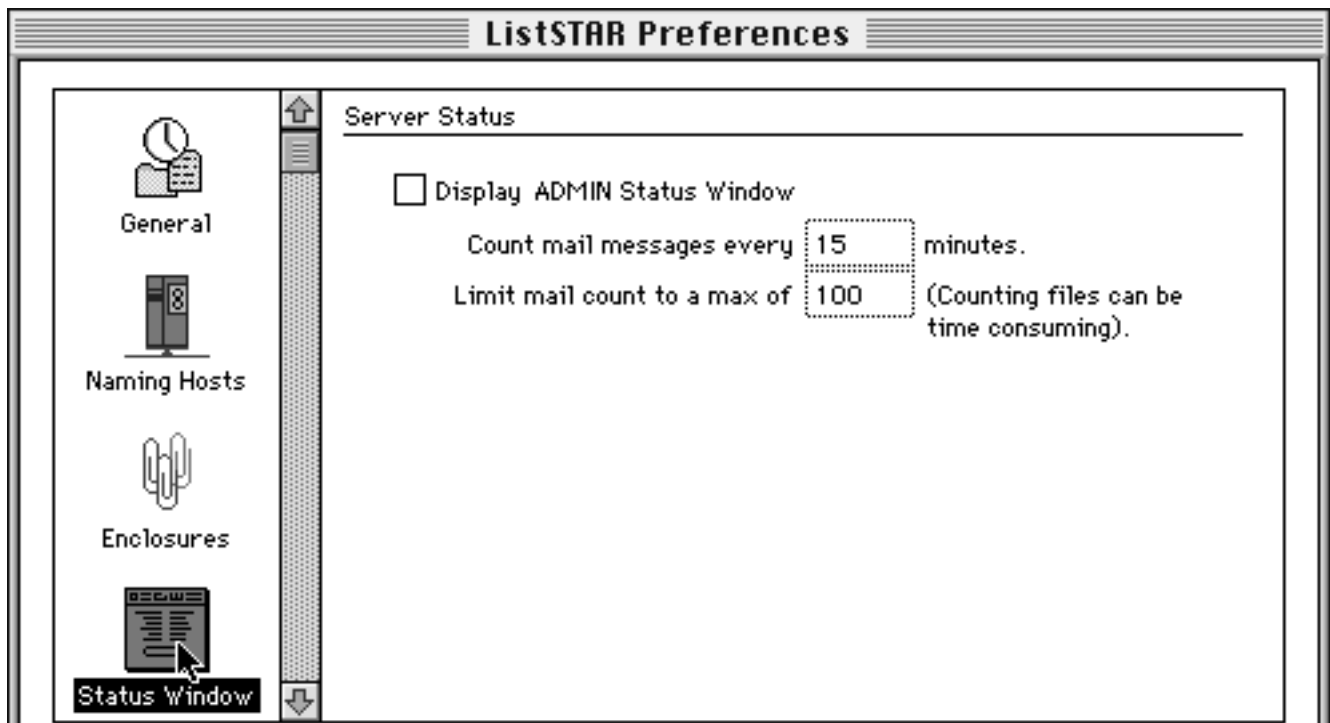


FIGURE 30 Status window configuration options

If the Display ADMIN Status window option is checked, a Status window opens whenever you launch the ListSTAR Server.

To keep the information in the Status window up-to-date, the ListSTAR Server software walks through the spool folder, counts the number of messages in the queue (inbound and outbound messages), and then updates the Status window with the latest information. By default, the fields in the Status window are updated every 15 minutes. If you want to use fewer resources to keep this information updated, type a number greater than 15 in the text field. If you are monitoring the ListSTAR Server closely, you can temporarily set this number much lower to update the ListSTAR Server every minute or so. We recommend that you use a number lower than 15 only when troubleshooting, because the process of counting messages can be resource-intensive.

The number in the Limit Mail Count field tells the ListSTAR Server to stop counting when it reaches a certain number of messages, 100 by default. The Status window will indicate that this number has been reached (and

probably exceeded) by displaying 100+. If you want to conserve resources and you don't need to know the number of messages at any given time, you can type a lower number in the text field. If you want to know the number of messages in the queue beyond 100 messages, type the number greater than 100 in the text field.

SMTP/TCP Network Options

In general, if you are not sure whether to change one or more of the SMTP/TCP network parameters, we recommend that you leave the defaults. The default settings are reasonable for most sites, unless the IP network is large or very complex.

To change the default values, click the SMTP/TCP icon in the left column of the Preferences dialog.

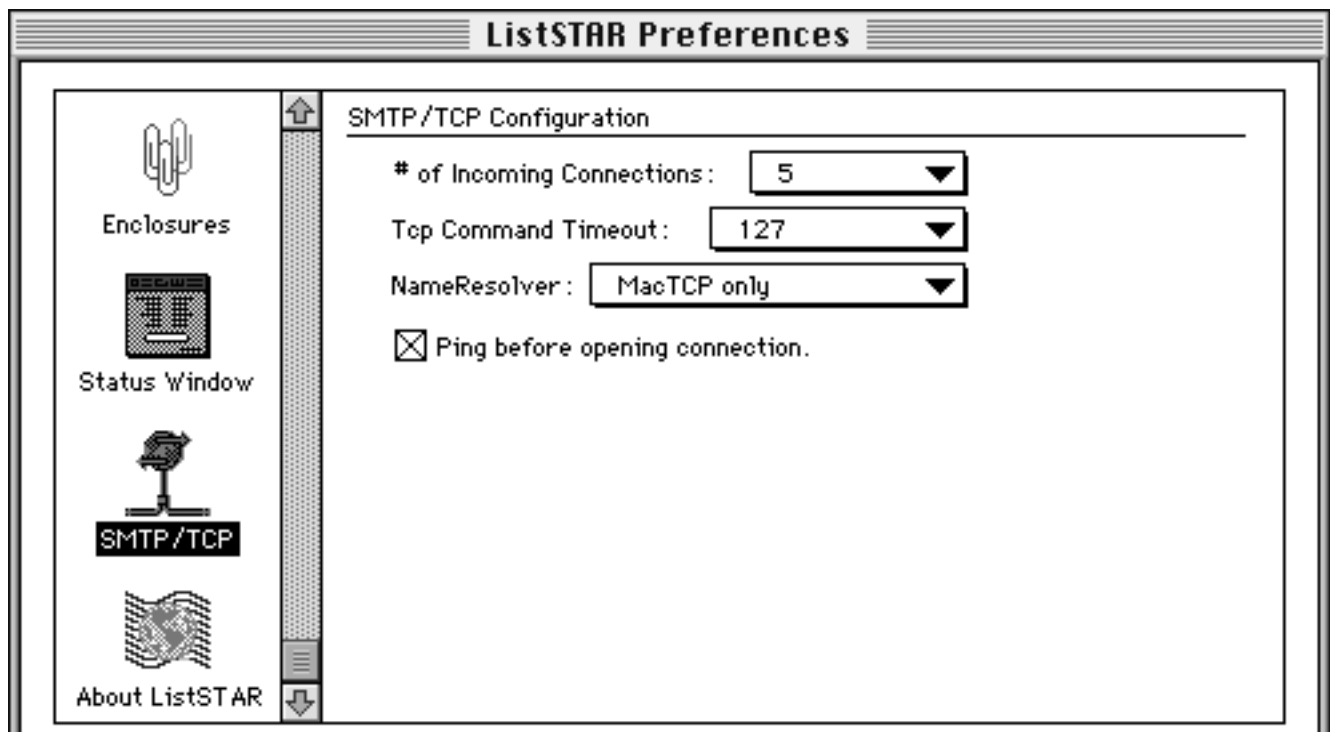


FIGURE 31 SMTP/TCP configuration window

of Incoming Connections

In a threaded environment, the number of incoming connections you configure determines how many threads will be allocated by the Thread Manager extension. The default number is 3, which results in a total of 7 threads—3 listeners, 2 senders, a control thread that can function as a sender, and the main thread. All listener and sender processes can operate concurrently. See *Threads Window* for more details.

If the ListSTAR Server's throughput is large, you can improve performance by setting this number to the maximum number of connections (5). When the number of incoming connections is set to 5, a total of 11 threads are allocated—5 listeners, 4 senders, a control thread that can function as a sender, and the main thread.

▲ **Important:** Each thread needs about 24K of memory. If you increase the number of incoming connections by 2 (from 3 to 5), you have added 4 new threads, which will require 96K additional memory in the

ListSTAR Server. If you choose the maximum of 5 connections, you should increase the application memory size of the ListSTAR Server to 1500K.

In a non-threaded environment (if you have unchecked the Enable Threads Support check box in the General pane), the ListSTAR Server enables multiple listener processes by multiplexing up to five listener processes on TCP socket #25. These multiple processes enable the ListSTAR Server to queue up to five mail sessions. However, the actual SMTP transaction (the transfer of mail) occurs one at a time while additional requests are accepted and queued.

By default, three listener processes are set up. This is the recommended minimum, because a single SMTP host can initiate multiple concurrent sessions. If the TCP/IP network at your site is large and the gateway processes a large amount of mail, you will improve throughput by setting this number to the maximum number of connections (five). Each incoming connection allocates a 16K buffer, so make sure the Macintosh has enough available memory for the number of connections you configure.

TCP Command Timeouts

The ListSTAR Server sends out TCP commands to initiate connections with the default mail host. By default, it waits 127 seconds before timing out the command and canceling the request. This is the recommended minimum, because it allows for reliable connections even during high-traffic hours. However, if there are several IP routers on your local network, you will improve the reliability of your connection by setting this number higher, to 191 or the maximum, 255 seconds.

If you need to increase the latency of the timeout period due to the complexity of your local IP network, click the TCP Command pop-up menu and select 191 or 255.

Name Resolution

Name resolution is the process by which an IP address is obtained for a specified host name. Hostnames and their respective IP addresses can be stored locally in the MacTCP Hosts file within the System Folder, or in the domain name system (DNS) on a network server.

If MacTCP has not been configured with the address of a domain name server, the default MacTCP Only is the only available option here. Addresses must be obtained from the Hosts file within the System Folder. A record for the default mail host must be present in that file.

If MacTCP *does* have a domain name server configuration, the other options in this menu are enabled. The option you choose determines the order in which records are requested, which can be significant in determining how mail is routed. The main issue is the use of Mail Exchange (MX) records. The MacTCP name resolver can read resource records in the formats understood by MacTCP (such as A, NS, CNAME, and HINFO). The StarNine resolver understands MX record format, which can contain routing information to another system, as well as the formats understood by MacTCP.

TABLE 34 Name Resolution Options

MacTCP Only	If there is no DNS configuration in MacTCP, all target addresses (such as the default mail host) must reside in the Hosts file. If there is a DNS configuration, the resolver first checks the local Hosts file. If the initial query does not return an address, the resolver queries the DNS system for a resource record that MacTCP understands (not MX).
-------------	---

TABLE 34 Name Resolution Options (Continued)

MacTCP then StarNine	The resolver first checks the local Hosts file. If the initial query does not return an address, the resolver queries the DNS system for a resource record that MacTCP understands (not MX). If that query fails to return an address, the resolver queries the DNS system for an MX record.
StarNine then MacTCP	The resolver first queries the DNS system for an MX record. If the initial query does not return an address, the StarNine resolver asks for <i>all</i> records about the host (a wildcard query). If an answer is still not obtained, the MacTCP resolver checks the local Hosts file and finally, if no address is found, queries the DNS system for a resource record it recognizes (not MX).
StarNine Only	The resolver queries the DNS system for an MX record. If the initial query does not return an address, it then queries the DNS system for <i>all</i> records (a wildcard query). The local Hosts file is not used.

Ping Before Attempting a TCP Connection

When the Ping option is unchecked, the ListSTAR Server attempts a TCP connection with the target host and times out after the number of seconds specified in the Command Timeout pop-up menu if that host is unavailable. During the connection attempt, the ListSTAR Server does not perform any other activity, such as processing mail.

If this option is checked, the ListSTAR Server sends an ICMP ping packet to the target host before attempting to open a TCP/IP connect session. The ping packet verifies that the host is available before the ListSTAR Server attempts a TCP connection. If the ListSTAR Server sends a ping packet and doesn't receive a response, it repeats the ping packet 10 times at 1 second intervals before giving up on the connection.

Serial Numbers Window

Serial Number Maintenance Window

The Serial Numbers command in the Windows menu lets you view and work with ListSTAR serial numbers.

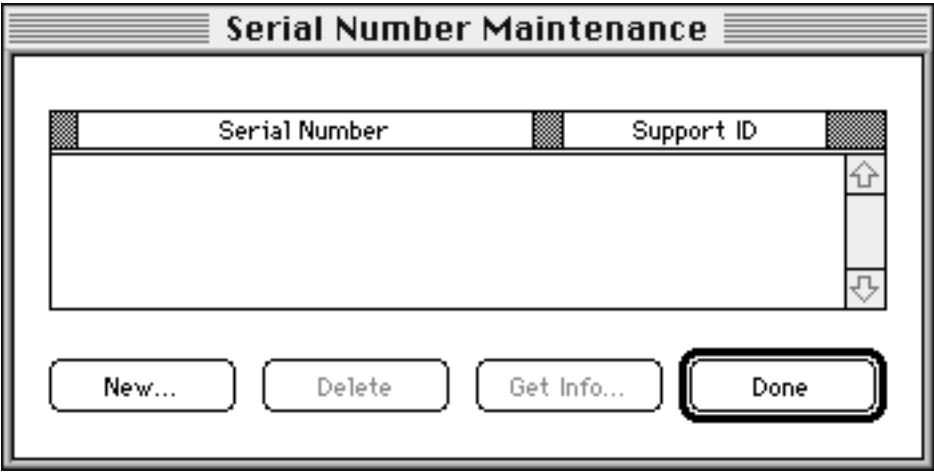


FIGURE 32 Serial Numbers

The columns in the Serial Number Maintenance window show the serial number and support ID. The serial number is the number you entered when you initially launched the ListSTAR Server. The support ID is a number that will be requested if you call StarNine Technical Support.

The buttons in Serial Number Maintenance window let you add, delete, or get more information about a number. Except for the New button, the buttons operate on a highlighted item. The buttons provide the following functions:

TABLE 35 Buttons in the Serial Number Maintenance Window

New	Opens a window where you can enter a serial number. For example, you may want to add a serial number if you purchase add-on modules in the future.
Delete	Deletes the selected serial number. For example, you may want to delete a Demo serial number that has expired when you enter the real serial number of the product.
Get Info	Opens a read-only window that shows the name of the ListSTAR product (such as ListSTAR/SMTP), the serial number, support ID, expiration date, and the start date.

Advanced Features and Concepts

This chapter discusses some of the concepts and supporting functionality of ListSTAR. It covers these topics:

How the ListSTAR Server Works

Regular Expression Support

AppleScript Support

ListSTAR AppleEvents

How the ListSTAR Server Works

The ListSTAR Server uses the spool folder located in the ListSTAR folder to store inbound messages waiting to be processed and outbound messages waiting to be transferred to the mail system.

Processing Inbound Messages

In the SMTP version of ListSTAR, messages are exchanged when the ListSTAR Server is contacted by an external SMTP host. As soon as the messages have been downloaded to the spool folder, the ListSTAR Server begins processing them as shown in the diagram.

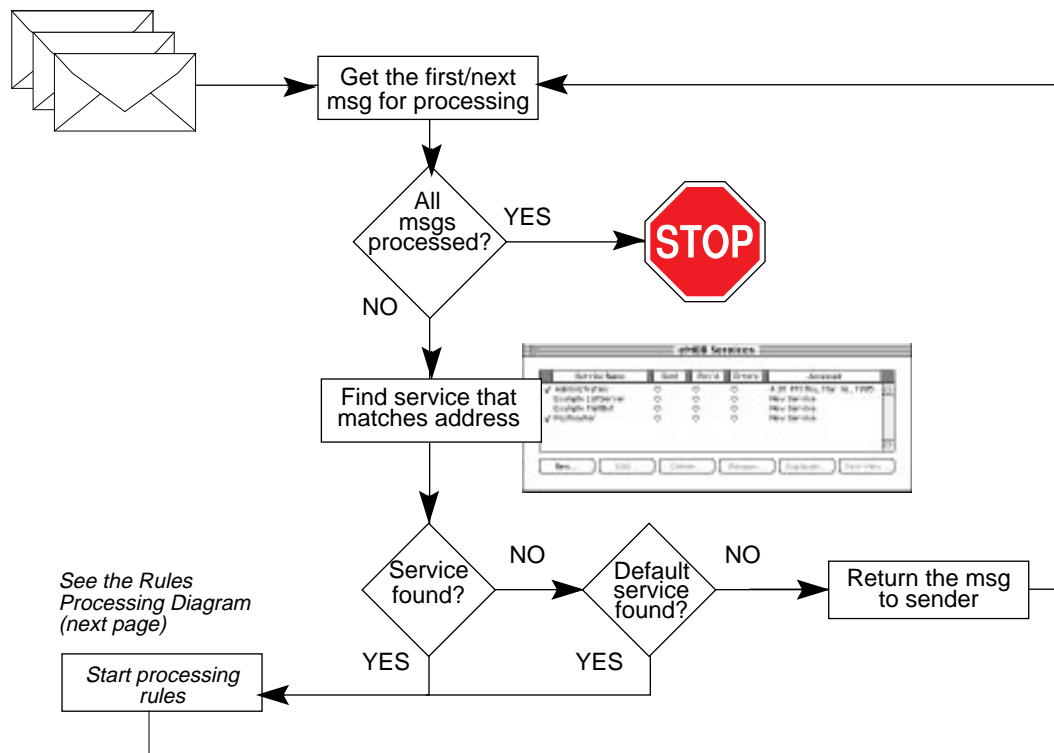


FIGURE 33 Message Processing diagram

If the ListSTAR Server is running in a threaded environment (the default), the receive threads can be actively receiving more than one message at a time. In that environment, the ListSTAR Server checks its spool folder every minute and processes the messages there as shown in the previous diagram (FIGURE 33). If the SMTP version is running in a non-threaded environment, the ListSTAR Server processes each message immediately, as it is received.

Rules Processing on Each Message

When a message has been delivered to the appropriate service, the ListSTAR Server begins processing the first rule in a service's rule list. This diagram is a continuation of the previous diagram (FIGURE 33).

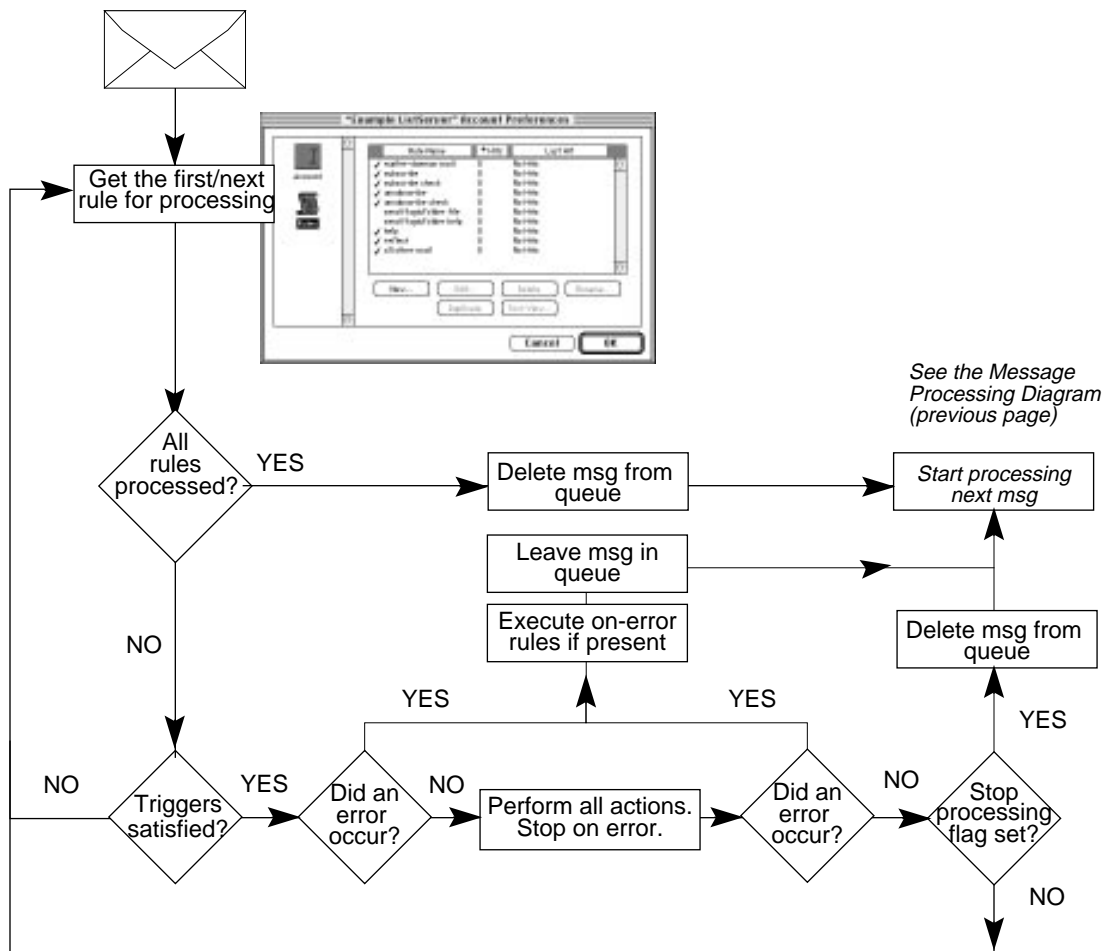


FIGURE 34 Rules Processing Diagram

When trigger conditions are satisfied in a rule, the ListSTAR Server performs all actions specified by rule. See [When processing errors occurred](#) for details about error conditions.

If no errors occur, the ListSTAR Server completes the actions and then checks for the Stop Rules Processing flag. If the flag is not set, it begins processing the next rule. If the flag is set, it deletes the message from the queue and processes the next message. When all messages in the queue have been processed, the ListSTAR Server processes outbound messages (if any), or stops.

Regular Expression Support

ListSTAR supports a limited form of regular expression (wild card) notation to specify the characteristics of a set of text strings that may occur within a message. A regular expression specifies a full set of text strings instead of one specific string. A member of this set of strings is matched by the regular expression.

- ❖ **Note:** Regular expression text searches are case insensitive except when a range of characters has been specified using the syntax [A-Z] or [a-z].

Although regular expressions can be used to recognize any character strings that vary from message to message, the most common use for them is to extract some information about the message that can then be passed as AppleScript statements to a text script. See [*A Regular Expression that Passes Data to AppleScripts*](#).

Wild Card Characters

The single characters listed below are wild cards supported in ListSTAR.

- **Period (.)**
A period matches any one character except a newline.
Example:
`.at` matches `cat`, `bat`, and so forth
- **Asterisk (*)**
An asterisk following a regular expression matches zero or more occurrences of the preceding expression or character. If there is any choice, the longest left-most string that permits a match is chosen.
Examples:
`cli*` matches `cli` as well as `cliiii` (zero or more `i` characters)
`cli.*` matches `cli`, `cliiii`, `cliff`, `clifford`, and so on (zero or more of any character)
- **Caret (^)**
A caret means *beginning of line*. When it appears at the beginning of a regular expression, it constrains that regular expression to match only the initial segment of a line. See “brackets” below for an exception to this meaning for the caret.
Example:
`^info.*` matches `info` or `information` only if it occurs first in a line
- **Dollar-sign (\$)**
A dollar sign means *end of line*. When it appears at the end of a regular expression, it constrains that regular expression to match only the final segment of a line.
Examples:
`info$` matches the string `info` only if it occurs at the end of a line
`info.*$` matches any line that contains `info` or `information`
`^info.*$` matches `info` or `information` only if the line contains no other characters.
- ❖ **Note:** The construction `^regular-expression$` constrains the regular expression to match the entire line exactly.
- **Backslash (\)**
A backslash escapes the wild-card meaning of the special character that follows it.
Examples:

`\$` matches a dollar-sign anywhere within a string

`\\` matches a backslash character

The OR Operator

Normally, when you concatenate multiple sub-expressions, the regular expression becomes more exclusive in which strings it will match. The OR operator (the OR bar `|`) lets a match occur if *any* of the sub-expressions are matched.

Example:

`^Postmaster|^daemon|^listserv` matches any one of the specified strings occurring at the beginning of a line

Brackets and Other Constructs

The following regular expression constructs are also supported in the ListSTAR Server:

- Brackets (`[]`)

When any ASCII characters are enclosed in brackets, the regular expression matches any one of the specified characters.

Examples:

`[abc]` matches a, b, or c

`[123]` matches 1, 2, or 3

If the first character of a string enclosed in brackets is a caret, the caret's meaning changes from *beginning of line* to *not*. The regular expression matches any character *except* the remaining characters in the string (or a newline). The `^` has this special meaning only if it occurs first in the bracketed string.

Example:

`[^abc]` matches any ASCII character (other than newline) except a, b, or c

You can use the hyphen (`-`) to specify a range of consecutive characters or numbers within brackets. For example, `[0-9]` is equivalent to `[0123456789]`. However, the hyphen has no special meaning if it occurs first or last in the string, or if the first character of the string enclosed in brackets is a caret.

Example:

`[0-9]` matches any character between 0 and 9, inclusive

`[A-Z]` matches any uppercase character between A and Z, inclusive

`[a-z]` matches any lowercase character between a and z, inclusive

The right-bracket character (`]`) can appear within a bracketed string if necessary, as long as it is the first character following the left-bracket or is preceded by only by a caret.

Example:

`[]a-f]` matches either a right-bracket or any one character between a and f, inclusive.

- Braces enclosing a numerical expression (`\{m, n\}`)

This construction is used to specify how many times the preceding regular expression must occur to be matched. The values of *m* and *n* must be non-negative integers less than 256.

Examples:

`[0-9]\{2\}` matches exactly 2 occurrences

`[0-9]\{50,\}` matches at least 50 occurrences

`[0-9]\{50,100\}` matches any number of occurrences between 50 and 100, inclusive

❖ **Note:** Whenever a choice exists, the regular expression matches as many occurrences as possible.

A Regular Expression that Passes Data to AppleScripts

The ListSTAR Server supports the specification of subexpressions (part of a regular expression enclosed in parentheses). Subexpressions are specified in this syntax:

```
\(regular-expression\)
```

For example,

```
\[ *x *\] Get file "\(.*\)" matches lines in this format:
```

```
[x] Get file "filename1"
[x] Get file "filename2"
[x] Get file "filename3"
```

When a match occurs between data in an incoming message and a regular expression enclosed in parentheses, the ListSTAR Server saves the matching data internally. If an AppleScript is executed later in the same rule, the ListSTAR Server passes that data to the script as a compound list. See [AppleScript Support](#) for more details. See the [Getting Started](#) guide for examples.

AppleScript Support

This section describes scripting support in ListSTAR. It is intended for programmers. You can use ListSTAR's ability to execute scripts to create add-on functionality that can completely customize a service to your requirements. See the example scripts in the AppleScripts folder for a good introduction.

Text Scripts, Compiled Scripts, and Applications

If the script to be executed is a text script, ListSTAR assigns values to certain StarNine-defined global variables and inserts them at the head of the script before passing it to AppleScript for execution. These StarNine global variables are described in [StarNine Variables and Values](#). To create a text script, save your script as Text Only in the Script Editor.

If the script doesn't need information about the message being processed, we recommend that you compile your script in the Script Editor to avoid the performance penalty of a compile each time the ListSTAR Server runs the script. To compile your script, choose Save As in the Script Editor File menu and save the script as a Compiled Script.

If the script to be executed is of type application, the ListSTAR Server sends the application an Apple event, after first launching the application if necessary. The Apple event has within it all of the information added as global variables at the head of text scripts, which is described in [StarNine Variables and Values](#). The ListSTAR Server then waits for a return Apple event from the application, from which it can extract a result (which may be nothing, an error or a positive value).

The application must have a special handler for the incoming Apple event sent by the ListSTAR Server; otherwise, the event is ignored. This handler must be in a function that is called whenever the AppleScript application receives an Apple event from the ListSTAR Server. The handler looks like this:

```
( *
** This subroutine will be invoked when the ListSTAR server is
** instructed to execute an AppleScript and the AppleScript selected
```

```

** is an "applet". See the next section for a description
** of the variables that are set and available to this subroutine.
*)
on «event 9evt9Lis» s9MailService ¬
    given «class s9nm»:s9SenderName, «class s9em»:s9SenderEmailAddress, ¬
        «class s9sj»:s9MailSubject, «class s9re»:s9RegularExpression, ¬
        «class s9fn»:s9MailFileName, «class s9mc»:s9SenderMC, ¬
        «class s9mz»:s9SenderMCZone, «class s9me»:s9SenderMCEmailAddress

    ( *
    ** Replace this "tell" statement with your own code. This
    ** "tell" statement will just display the values of the
    ** variables set by the ListSTAR server when it invokes
    ** this applet.
    *)
    tell application "Scriptable Text Editor"
        set selection of front window to "Got Event" & return & ¬
            "s9MailService=" & s9MailService & return & ¬
            "s9SenderName=" & s9SenderName & return & ¬
            "s9SenderEmailAddress=" & s9SenderEmailAddress & return & ¬
            "s9MailSubject=" & s9MailSubject & return & ¬
            "s9RegularExpression=" & s9RegularExpression & return & ¬
            "s9MailFileName=" & s9MailFileName & return & ¬
            "s9SenderMC=" & s9SenderMC & return & ¬
            "s9SenderMCZone=" & s9SenderMCZone & return & ¬
            "s9SenderMCEmailAddress=" & s9SenderMCEmailAddress & return & ¬
            return
        end tell
    end «event 9evt9Lis»

```

This event handler writes all of the arguments passed by the ListSTAR Server to the Scriptable Text Editor. It is just an example of the event handling that has to take place. An AppleScript application with an event handler like this one will execute much faster than a text script, especially if you mark the application as Stay Open and Don't Show Startup Screen.

StarNine Variables and Values

All of the variables inserted at the head of a text script represent information about the message that is currently being processed. These are the variables that can be inserted:

TABLE 36 StarNine Variables

StarNine Variable	Value Assigned
s9MailService	Name of the service processing the mail
s9SenderName	Name of the user who sent the mail
s9SenderEmailAddress	E-mail address of the user who sent the mail (see Address Formats)
s9SenderMC	MailCenter portion of the sender's address (see Address Formats)
s9SenderMCZone	MailCenter Zone portion of the sender's address (see Address Formats)

TABLE 36 StarNine Variables (Continued)

StarNine Variable	Value Assigned
<code>s9SenderMCEmailAddress</code>	Portion of the sender's address needed to deliver the mail from the sender's MailCenter (see <i>Address Formats</i>)
<code>s9MailSubject</code>	Subject of the message
<code>s9MailFileName</code>	Filename (not a full pathname) of the mail file in Message Spool folder
<code>s9RegularExpression</code>	Data obtained by parsing the message (see <i>A Regular Expression that Passes Data to AppleScripts</i>)

Address Formats

The `s9SenderEmailAddress` variable contains the sender's E-mail address, which you can use directly as a recipient address. The `s9SenderMC`, `s9SenderMCZone` and `s9SenderMCEmailAddress` contain sub-fields of the sender's E-mail address, and are of concern only for addresses received from QuickMail or Microsoft Mail. (Microsoft Mail addresses do not use the `s9SenderMCZone` sub-field.) For SMTP and POP addresses, the values of the `s9SenderEmailAddress` and `s9SenderMCEmailAddress` fields are the same.

SMTP and POP Addresses

The following addresses are domain-style E-mail addresses used by SMTP or POP mail systems.

```
stack@ae.abc.com
```

```
("Michael 'AppleScript Demon' Stack") stack@ae.abc.com
```

Either of these addresses could be written as the value of these variables:

```
s9SenderEmailAddress      ("Michael 'AppleScript Demon' Stack") stack@ae.abc.com
s9SenderMC
s9SenderMCZone
s9SenderMCEmailAddress    ("Michael 'AppleScript Demon' Stack") stack@ae.abc.com
```

For SMTP or POP addresses the `s9SenderMC` and `s9SenderMCZone` variables are empty.

QuickMail Addresses

The following is an address received from the QuickMail system:

```
Stack|Michael@ABC_MAILCENTER ABC_MAIN_ZONE:stack@ae.abc.com
```

QuickMail uses this special-addressing format when transmitting mail across mail systems:

```
[last]|first[@mailcenter[ zone][:address]]
```

In this example, the following values are assigned to StarNine variables:

```
s9SenderEmailAddress      Stack|Michael@ABC_MAILCENTER ABC_MAIN_ZONE:stack@ae.abc.com
```

```
s9SenderMC           ABC_MAILCENTER
s9SenderMCZone       ABC_MAIN_ZONE
s9SenderMCEmailAddress stack@ae.abc.com
```

Microsoft Mail Addresses

The following are addresses received from the Microsoft Mail system:

```
Michael Stack@ABC_MAILCENTER
Michael Stack@ABC_MAILCENTER:stack@ae.abc.com
```

The first address is a simple Microsoft Mail address where ABC_MAILCENTER is the name of a Microsoft Mail Server. The second addresses uses the StarNine convention of including an E-mail address portion of a foreign address by appending a colon and the E-mail address. (This convention is consistent with the QuickMail address format described above.)

In the second example, the following values are assigned to StarNine variables:

```
s9SenderEmailAddress Michael Stack@ABC_MAILCENTER:stack@ae.abc.com
s9SenderMC           ABC_MAILCENTER
s9SenderMCZone
s9SenderMCEmailAddress stack@ae.abc.com
```

Executing AppleScripts

ListSTAR can execute an AppleScript as a trigger or an action. In either case, the script must return a value.

AppleScripts Executed as a Trigger

When ListSTAR executes an AppleScript as a trigger, the script must return a positive number to indicate that the trigger succeeded and zero when the trigger fails. A negative number is an error.

- 1 or any positive number means the trigger succeeded (the condition is true)
 - 0 means the trigger failed (the condition is false)
 - -1 or any negative number means there was an error on execution
- ❖ **Note:** If an error code is encountered, the message will be queued and reprocessed at the next interval.

For example, you can write an AppleScript that determines if the From address of a message is in an external database such as FileMaker. Or, you can check content in the incoming message that is not accessible through the current rules interface, such as some other item in the RFC header. For both of these examples, the AppleScript must be a text script or an Applet, because it requires information about the message that is currently being processed.

The example script shown immediately below looks at the StarNine `s9SenderName` variable. If the sender's name is "Mohammed Ali," the script returns 1, causing the trigger to succeed. Otherwise, it returns 0.

```

if s9SenderName is "mohammed ali" then
    return 1      -- It is indeed himself, return 1
else
    return 0      -- It might be sonny liston, trigger fails by returning 0
end if

```

You can also write an AppleScript that does not require information about the current message, for example, one that determines the time of day and returns a value to the ListSTAR Server. That AppleScript could be executed as a compiled script. For example, the script shown immediately below looks at the time and returns 1 (causing the trigger to succeed) if it's a Tuesday and 0 for everything else:

```

if weekday of (current date) is "tuesday" then
    return 1      -- It is Tuesday, return 1
else
    return 0      -- It's not Tuesday, trigger fails by returning 0
end if

```

AppleScripts Executed as an Action

When ListSTAR executes an AppleScript as an action, the AppleScript *must* return a zero on success. Any return value *other* than zero indicates an error on execution.

- 0 means the action executed successfully
- any other return value means there was an error on execution

❖ **Note:** If an error code is encountered, the message will be queued and reprocessed at the next interval.

Scripts that do not return any value will produce a -1700 error in the ListSTAR log. For example, in the script shown immediately below, if the sender's name is "Mohammed Ali," the script will speak "You're the Greatest."

Notice that the ending `return 0` is returned on successful execution of the script action.

```

if s9SenderName is "mohammed ali" then
    speak "You're the Greatest"      -- He is indeed the greatest
end if

return 0

```

An AppleScript executed as an action processes the incoming message. You can give the script access to the entire message by first copying the message to a file (see [AppleScript Actions](#)). Each time this action is performed, the current message overwrites the previous one stored in that file. Your AppleScript can open and process the file; for example, it can copy the file into an output message, or parse it for a specific pattern.

❖ **Note:** The ListSTAR action that copies the body of the message to a file does not copy the message header. To get at the header, you should make a copy of the file whose name is contained in the `s9MailFileName` variable (a file in the Message Spool folder) and work with that copy. Remember that the variable contains only the filename, not the full pathname to the Message Spool folder.

ListSTAR Apple Events

ListSTAR includes Apple events that can tell the ListSTAR Server to send mail, write a log message, and perform other actions. These events can be very useful for administering ListSTAR under script control or from a remote Macintosh, or for using the ListSTAR Server to send messages based on the execution of another application. These events can be found in the Apple event Dictionary for the ListSTAR Server, viewable in the Script Editor.

These are the Apple events recognized by the server:

- **StarNine Send**—Send a mail message

This event invokes the ListSTAR Server to send a mail message from another application or an AppleScript. Its syntax is specified in detail in the dictionary. Here's a segment of a script that uses the Send event:

```
tell application "ListSTAR Server"
    set recoAddress to ({FreeFormName:"Michael Stack",
    EMailAddress:"stack@abc.com"}) as StarNineAddress)
    set recoAddress2 to ({FreeFormName:"Michael QM Stack",
    EMailAddress:"stack@mac_smtp.abc.com"}) as StarNineAddress)
    StarNine Send "donut" ↵
        To {recoAddress, recoAddress2} ↵
        Subject "My Subject Jimmy" ↵
        Body "Jimmy's at Gold's Jim" Priority Urgent ↵
        Enclosures {"d:untitled" as alias}
end tell
```

▲ **Important:** If an AppleScript sends a StarNine Send Apple event to the ListSTAR Server and this completes successfully, and then later the script returns an error code to the ListSTAR Server, you will end up sending duplicate messages. The message that triggered the rule will be queued and reprocessed, probably re-invoking the AppleScript that generates the StarNine Send Apple event to the server (which succeeds) and then returning an error which causes it to be queued and reprocessed, and so forth. Be careful when you use this operation in your AppleScripts.

- **StarNine Log**—Log a message

This event writes a message to the ListSTAR Server log.

- **StarNine Subscribe**—Add to the specified address list

This event subscribes the passed list of addresses to the specified StarNine address list.

- **StarNine Unsubscribe**—Delete from the specified address list

This event unsubscribes the passed list of addresses to the specified StarNine address list.

- **StarNine Is**—Verify the presence of an address

This event checks to see if the passed address is present in the specified StarNine address list and returns TRUE if the address is present. It will return an error positive 107 if the user is already in the address list (you cannot add a duplicate entry to an address list), or if you try to unsubscribe a user who is not in the address list.

Details About Enclosure Processing

This Appendix contains detailed information about how file enclosures are processed by the ListSTAR Server. Click one of the following topics to go to an explanation of that topic:

[MIME Enclosure Processing](#)

[File type to PC Extension Mapping](#)

[ISO 8859-1 Translation Tables](#)

MIME Enclosure Processing

The proposed MacMIME standard for enclosure encoding is implemented in the ListSTAR Server. This standard is 100% compatible with the MIME standard, but allows more flexibility when dealing with incoming encoded MIME messages that contain Macintosh enclosures.

Many types of systems and gateways are supporting MIME encoding as the new Internet standard. You can verify that a system supports MIME by checking whether the RFC header in a message from that system contains the string MIME-Version:. This string is required in the RFC headers of messages that are MIME-encoded.

When incoming MIME messages contain multiple parts of type text, the ListSTAR Server places only the first MIME text body part in the message body. Other text parts (some of which may include information other than message text) are left with the MIME header and the following Note is displayed:

```
***** NOTE *****
There may be important message content
contained in the following MIME Information.
*****
----- MIME Information follows -----
```

The Note shown immediately above is intended to alert the reader that more message content may be included with the MIME header.

If you select MIME for file enclosure handling and body text, and the receiving system or gateway doesn't support MIME, the message body will still be readable for the most part. The recipient will see some unusual line breaks and translated characters in the message body. However, if ListSTAR encloses a large file that contains formatting information and graphics, the translations and encoding that occur for MIME will make the enclosure difficult or impossible to use. If the recipient notifies the ListSTAR administrator that a file was received but was unusable, the administrator can change the ListSTAR Server configuration to a different enclosure processing setup.

Quoted-Printable MIME

The Quoted-Printable MIME encoding represents printable 8-bit ASCII characters in a way that is unlikely to be modified by mail transport. With the exceptions detailed in RFC 1521, it converts an octet into an equal-sign (=) followed by a two-digit hexadecimal representation of the octet's value. Uppercase letters (ABCDEF) are used when sending hexadecimal data. For example, the octet with the ASCII value 12 (a form

feed) is sent as =0C. Or, an octet with the value 61 (an equal sign) is sent as =3D. The Quoted-Printable MIME options have their own 76-character line length limits built in.

ISO-8859-1 MIME

The ISO-8859-1 character set includes the full Latin alphabet as 8-bit, single-byte, coded graphic characters, as shown in *ISO 8859-1 Translation Tables*. ISO-8859-1 is a standard character set used by most of Europe and many UNIX systems.

If ISO-8859-1 MIME is selected as a file (or message body) translation method, outbound messages are encoded first by mapping the Macintosh character set to ISO-8859-1 and then encoded in MIME. Inbound messages from the specified address are decoded from MIME, and also decoded from ISO-8859-1 to the Macintosh character set.

Mapping Macintosh Type and Creator on Outbound Enclosures

This section shows how MIME represents the TYPE and CREATOR of Macintosh files enclosed in outbound messages. This representation enables the receiving system to reassign the Macintosh TYPE and CREATOR before delivering the message and enclosure.

MIME Encode Mappings

TYPE	CREATOR	MIME CONTENT-TYPE/SUBTYPE FIELDS
TEXT	BnHq	application/mac-binhex40
TEXT	^FSF	application/postscript
TEXT	vgrd	application/postscript
TEXT	????	text/plain
????	MSWD	application/msword
????	MW2D	application/macwriteii
????	WPC2	application/wordperfect5.1
GIFf	????	image/gif
JPEG	????	image/jpeg
JFIF	????	image/jpeg
jfif	????	image/jpeg
TIFF	????	image/tiff
ULAW	????	audio/basic
MPEG	????	video/mpeg
MooV	????	video/quicktime
PICT	????	image/x-pict
jB1	????	audio/x-macaudio
FSSD	????	audio/x-macaudio

The ???? designator is a wild card that means *any*. For example, if the enclosure is a file of type JPEG, created by any application, it is assigned the MIME CONTENT-TYPE image and the SUBTYPE jpeg. Or if a file is

created by WordPerfect (that is, its creator is WPC2), of any type, it is assigned the CONTENT-TYPE application and the SUBTYPE wordperfect5.1.

Reassigning Type and Creator on Incoming Enclosures

When the ListSTAR Server receives an incoming MIME-encoded message, it attempts to reassign the Macintosh type and creator for all file enclosures. Its first attempt is based on the content of the MIME SUBTYPE field using the mappings shown below. For example, if the incoming message has a MIME SUBTYPE of msword, the decoded enclosure will be assigned the type WDBN and the creator MSWD.

The entries below that have a ???? wild card in both the TYPE and CREATOR fields are usually multi-part files for which it would be inappropriate to assign a type and creator. For example, if the incoming message has a MIME SUBTYPE of appledouble, the enclosed file has a resource fork that already specifies its type and creator.

MIME Subtype Decode Mappings

MIME SUBTYPE	TYPE	CREATOR
plain	TEXT	ttxt
richtext	TEXT	ttxt
tab-separated-values	TEXT	ttxt
enriched	TEXT	ttxt
applefile	????	????
octet-stream	????	????
postscript	TEXT	^FSF
mac-binhex40	TEXT	BnHq
wordperfect5.1	.WP5	WPC2
macwriteii	MWII	MW2D
msword	WDBN	MSWD
appledouble	????	????
header-set	????	????
mixed	????	????
alternative	????	????
parallel	????	????
digest	????	????
rfc822	????	????
partial	TEXT	MimP
external-body	????	????
news	????	????
gif	GIFf	JVWR
jpeg	JPEG	JVWR

MIME Subtype Decode Mappings (Continued)

MIME SUBTYPE	TYPE	CREATOR
tiff	TIFF	JVWR
ief	????	????
basic	ULAW	SNDM
mpeg	MPEG	mMPG
quicktime	MooV	TVOD
activemessage	????	????
zip	pZIP	pZIP
news-message-id	????	????
news-transmission	????	????
rtf	TEXT	MSWD
slate	????	????
wita	????	????
andrew-inset	????	????
pdf	????	????
remote-printing	????	????
dca-dx	????	????
dec-rft	????	????
ODA	????	????
atomicmail	????	????
x-pict	PICT	ttxt
x-macaudio	JB1	????

If the SUBTYPE field of an incoming message is text/x-private, the ListSTAR Server attempts to assign a type and creator based on the MIME CONTENT-TYPE field instead of the SUBTYPE, using the mappings shown below. As you can see, the only CONTENT-TYPE decoding that is currently recognized is type text.

MIME Content-type Decode Mappings

MIME CONTENT-TYPE	TYPE	CREATOR
text	TEXT	ttxt
application	????	????
multipart	????	????
image	????	????
audio	????	????
message	????	????
video	????	????

File type to PC Extension Mapping

When you select File type to PC Extension as a file translation method, the ListSTAR Server invokes a PC translation module that maps DOS filename extensions to Macintosh icons. This section shows the DOS filename extension mappings that are hard-coded into the PC translation module.

❖ **Note:** If you want to add more extension mappings, contact StarNine for a template and technical note that describes the procedure.

The PC file translation module reads a resource that contains the mappings shown on the next pages, and applies the first match it finds. For example, if it finds a DOS filename extension on an inbound file enclosure, it sets the file's Macintosh file type and creator according to the first instance of that extension in the table. Or, if it finds a Macintosh type and creator in an enclosure, it appends the extension specified in the first instance of that type and creator combination. For example, if a Macintosh Excel document is enclosed that has type = TEXT and creator = XCEL, it will get the DOS filename *filename.SLK*.

These are the extensions and type/creator specifications specified in the PC translation resource.

File type to PC Extension Mappings

EXTENSION	TYPE	CREATOR	COMMENT
EPS	EPSF	ARTZ	Adobe Illustrator
SIT	SIT!	SIT!	Stuffit & TeachText
TXT	TEXT	ttxt	
DBF	F+DB	FOX+	Lotus & MS Foxbase
WK3	LWK3	L123	
DOC	WDBN	MSWD	MS Word
MCW	WDBN	MSWD	
WRI	WDBN	MSWD	
WRD	TEXT	MSWD	
RTF	TEXT	MSWD	
STY	TEXT	MSWD	
GLY	TEXT	MSWD	
PPT	SLD2	PPT2	PowerPoint
PPT	SLD3	PPT3	
MPP	MSPF	MSPJ	
MPX	MSPJ	MSPJ	
MPC	MSPJ	MSPJ	
MPV	MSPJ	MSPJ	
MPW	MSPF	MSPJ	
RPL	FRL!	REP!	Replica

File type to PC Extension Mappings (Continued)

EXTENSION	TYPE	CREATOR	COMMENT
XLC	XLC3	XCEL	Excel
XLS	XLS3	XCEL	
XLM	XLM3	XCEL	
XLW	XLW3	XCEL	
LA	XLA	XCEL	
XLT	SLM3	XCEL	
XLC	XLC4	XCEL	
XLS	XLS4	XCEL	
XLM	XLM4	XCEL	
XLW	XLW4	XCEL	
XLA	XLA	XCEL	
XLT	SLM3	XCEL	
SLK	TEXT	XCEL	
CSV	TEXT	XCEL	PageMaker
PUB	PUBF	ALD2	
PM3	ALB3	ALD3	
PT3	ALT3	ALD3	
TEM	ALT3	ALD3	
TPL	ALT3	ALD3	
TIF	TIFF	ALD3	
PM4	ALB4	ALD4	
PT4	ALT4	ALD4	
TEM	ALT4	ALD4	
TPL	ALT4	ALD4	
TIF	TIFF	ALD4	
RDY	TEXT	MORE	PC Programs and Unknown
	TEXT	LMAN	
DIF	TEXT	XCEL	README.1ST files+SimpleText
1ST	TEXT	ttxt	
ASC	TEXT	ttxt	
BAT	TEXT	ttxt	
CMD	TEXT	ttxt	
ME	TEXT	ttxt	
AIF	AIFF	jBox	AIFF sound+Sound Edit

File type to PC Extension Mappings (Continued)

EXTENSION	TYPE	CREATOR	COMMENT
AU	ULAW	SCPL	mu-law audio file+SoundApp
AU	ULAW	SNDM	mu-law audio file+Sound Machine
ARC	mArc	arc*	ARC archives+ArcMac
ARJ	BINA	DArj	ARJ archives+DeArj
BAR	BARF	S691	Unix BAR archive+Suntar
CPT	TEXT	SITx	CompactPro archives+Stuffit Expander
CPT	PACT	CPCT	CompactPro archives+CptExpand
HQX	TEXT	BnHq	BinHex encoded+BinHex
PIT	PIT	UPIT	Packit archive+Unpackit
ZIP	pZIP	pZIP	PKzip archive+Unzip
C	TEXT	ttxt	C source+SimpleText
H	TEXT	ttxt	C Header source+SimpleText
MAK	TEXT	ttxt	Make text file +SimpleText
CP	TEXT	ttxt	C++ source+SimpleText
CPP	TEXT	ttxt	C++ source+SimpleText
BAS	TEXT	ttxt	BASIC source+SimpleText
ASM	TEXT	ttxt	Assembler source+SimpleText
BOO	TEXT	ttxt	BOO-encoded+SimpleText
FAQ	TEXT	ttxt	FAQ text file+SimpleText
FOR	TEXT	ttxt	FORTTRAN source+SimpleText
I3	TEXT	ttxt	Modula3 interface+SimpleText
OUT	TEXT	ttxt	text output file+SimpleText
P	TEXT	ttxt	Pascal source+SimpleText
PAS	TEXT	ttxt	Pascal source+SimpleText
TXT	TEXT	R*ch	Pascal source+BBEdit
GIF	GIFf	JVWR	Graphics Interchange+JPEGView
JPG	JPEG	JVWR	TIFF image+JPEGView
TIF	TIFF	JVWR	JPEG image+JPEGView
BMP	BMPp	JVWR	Windows bitmap+JPEGView
BGA	BMPp	JVWR	OS+2 bitmap+JPEGView
CGM	CGMm	GKON	Computer Graphics meta+Graphics Converter
CVS	drw2	DAD2	Canvas+Canvas
DL	DLdI	GKON	DL animation+Graphics Converter
FLC	FLI	GKON	Animator Pro FLIC file+Graphics Converter

File type to PC Extension Mappings (Continued)

EXTENSION	TYPE	CREATOR	COMMENT
FLI	FLI	GKON	Animator Pro FLIC file+Graphics Converter
ICO	ICO	GKON	Windows icon+Graphics Converter
IFF	ILBM	GKON	Amiga IFF image+Graphics Converter
IMG	IMGg	GKON	GEM bit image+Graphics Converter
MSP	MSPp	GKON	Portable bit-map+Graphics Converter
PBM	PPGM	GKON	Microsoft Paint+Graphics Converter
MAC	PICT	ttxt	Mac PICT image+Simple Text
PCT	PICT	ttxt	
PIC	PICT	ttxt	
BIN	TEXT	GJBU	MacBinary+MacBinary II
COM	BINA	mdos	MS-DOS executable+SoftPC
COM	PCFA	PCXT	MS-DOS executable+SoftPC
EXE	PCFA	PCXT	MS-DOS executable+SoftPC
EPS	EPSF	vgrd	Encapsulated Postscript+icon from LaserWriter driver
FM	FMPR	FMPR	FileMaker+FileMaker Pro
WP	WPPC	SSIW	WordPerfect PC 4.2+WordPerfect Mac 1.0.2
WP5	.WP5	WPC2	WordPerfect PC 5+WordPerfect Mac
WPG	WPGg	GKON	WordPerfect graphic+Graphics Converter
WPM	WPD1	WPC2	WordPerfect Mac+WordPerfect Mac
MOV	MooV	TVOD	QuickTime movie+SimplePlayer
QT	MooV	TVOD	QuickTime movie+SimplePlayer
MPG	MPEG	mMPG	MPEG movie+Sparkle

ISO 8859-1 Translation Tables

This section shows the translation tables that are used when ISO 8859-1 translation is selected for the message body or file translation method.

Macintosh to ISO 8859-1

This table shows Macintosh-to-ISO translations performed on outbound mail when ISO 8859-1 or ISO 8859-1 MIME is selected as the enclosure processing method.

Macintosh-to-ISO 8859-1 Translation Table

Sending Macintosh		ISO 8859-1	
Hex Value	Character	Hex Value	Character
80	Ä	C4	'A'
81	Å	C5	Ä
82	Ç	C7	Ç
83	É	C9	É
84	Ñ	D1	Ñ
85	Ö	D6	'O'
86	Ü	DC	'U'
87	á	E1	á
88	à	E0	à
89	â	E2	â
8A	ä	E4	ä
8B	ã	E3	ã
8C	â	E5	â
8D	ç	E7	ç
8E	é	E9	é
8F	è	E8	è
90	ê	EA	ê
91	ë	EB	ë
92	í	ED	í
93	ì	EC	ì
94	î	EE	î
95	ï	EF	ï
96	ñ	F1	ñ
97	ó	F3	ó
98	ò	F2	ò
99	ô	F4	ô
9A	ö	F6	ö
9B	õ	F5	õ
9C	ú	FA	ú
9D	ù	F9	ù
9E	û	FB	û
9F	ü	FC	ü
A0	†	2B	+
A1	°	B0	°

Macintosh-to-ISO 8859-1 Translation Table (Continued)

Sending Macintosh		ISO 8859-1	
Hex Value	Character	Hex Value	Character
A2	¢	A2	¢
A3	£	A3	£
A4	§	A7	§
A5	•	B7	•
A6	¶	B6	¶
A7	ß	DF	ß
A8	®	AE	®
A9	©	A9	©
AA	™	2A	*
AB	´	B4	´
AC	¨	A8	¨
AD	≠	2A	*
AE	Æ	C6	Æ
AF	Ø	D8	Ø
B0	∞	2A	*
B1	±	B1	±
B2	≤	2A	*
B3	≥	2A	*
B4	¥	A5	¥
B5	μ	B5	μ
B6	∂	2A	*
B7	Σ	2A	*
B8	Π	2A	*
B9	π	70	ρ
BA	∫	2A	*
BB	ª	AA	ª
BC	º	BA	º
BD	Ω	2A	*
BE	æ	E6	æ
BF	ø	F8	ø
C0	¿	BF	¿
C1	¡	A1	¡
C2	¬	AC	¬
C3	√	2A	*
C4	ƒ	66	f
C5	≈	3D	=
C6	Δ	2A	*

Macintosh-to-ISO 8859-1 Translation Table (Continued)

Sending Macintosh		ISO 8859-1	
Hex Value	Character	Hex Value	Character
C7	«	AB	«
C8	»	BB	»
C9	...	2A	*
CA	NBSP	A0	NBSP
CB	À	C0	À
CC	Ã	C3	Ã
CD	Ö	D5	Ö
CE	Œ	2A	*
CF	œ	2A	*
D0	-	AD	SHY
D1	—	AD	SHY
D2	"	22	"
D3	"	22	"
D4	'	27	'
D5	'	27	'
D6	÷	F7	÷
D7	◊	2A	*
D8	ÿ	FF	ÿ
D9	Ÿ	FF	Ÿ
DA	/	2F	/
DB	¤	A4	¤
DC	<	3C	<
DD	>	3E	>
DE	fi	DE	Œ
DF	fl	FE	Œ
E0	‡	2A	*
E1	•	B7	•
E2	,	2C	,
E3	"	2C	,
E4	‰	25	%
E5	Â	C2	Â
E6	Ê	CA	Ê
E7	Á	C1	Á
E8	Ë	CB	Ë
E9	È	C8	È
EA	Í	CD	Í
EB	Î	CE	Î

Macintosh-to-ISO 8859-1 Translation Table (Continued)

Sending Macintosh		ISO 8859-1	
Hex Value	Character	Hex Value	Character
EC	İ	CF	İ
ED	ı	CC	ı
EE	Ó	D3	Ó
EF	Ô	D4	Ô
F0	Apple logo	2A	*
F1	Ò	D2	Ò
F2	Ú	DA	Ú
F3	Û	DB	Û
F4	Ü	D9	Ü
F5		7C	
F6	^	5E	^
F7	~	7E	~
F8	-	AF	-
F9	˘	2A	*
FA	·	27	'
FB	°	B0	°
FC	¸	B8	,
FD	˝	A8	˝
FE	˙	B8	,
FF	˘	2A	*

ISO 8859-1 to Macintosh

The ISO-to-Macintosh translations shown below are performed on incoming mail when MIME ISO-8859-1 encoding is used in the message body or file enclosure. If an ISO 8859-1 character is marked (n/a), it means that there is no character mapped to that value in the ISO 8859-1 character set, so the Macintosh character is passed through without translation.

ISO 8859-1-to-Macintosh Translation Table

ISO 8859-1		Receiving Macintosh	
Hex Value	Character	Hex Value	Character
80	(n/a)	80	Ä
81	(n/a)	81	Å
82	(n/a)	82	Ç
83	(n/a)	83	É
84	(n/a)	84	Ñ
85	(n/a)	85	Ö

ISO 8859-1-to-Macintosh Translation Table (Continued)

ISO 8859-1		Receiving Macintosh	
Hex Value	Character	Hex Value	Character
86	(n/a)	86	Ü
87	(n/a)	87	á
88	(n/a)	88	à
89	(n/a)	89	â
8A	(n/a)	8A	ä
8B	(n/a)	8B	ã
8C	(n/a)	8C	å
8D	(n/a)	8D	ç
8E	(n/a)	8E	é
8F	(n/a)	8F	è
90	(n/a)	90	ê
91	(n/a)	91	ë
92	(n/a)	92	í
93	(n/a)	93	ì
94	(n/a)	94	î
95	(n/a)	95	ï
96	(n/a)	96	ñ
97	(n/a)	97	ó
98	(n/a)	98	ò
99	(n/a)	99	õ
9A	(n/a)	9A	ö
9B	(n/a)	9B	ø
9C	(n/a)	9C	ú
9D	(n/a)	9D	ù
9E	(n/a)	9E	û
9F	(n/a)	9F	ü
A0	NBSP	CA	NBSP
A1	¡	C1	¡
A2	¢	A2	¢
A3	£	A3	£
A4	¤	DB	¤
A5	¥	B4	¥
A6	¦	7C	
A7	§	A4	§
A8	¨	AC	¨
A9	©	A9	©

ISO 8859-1-to-Macintosh Translation Table (Continued)

ISO 8859-1		Receiving Macintosh	
Hex Value	Character	Hex Value	Character
AA	ª	BB	ª
AB	«	C7	«
AC	¬	C2	¬
AD	SHY	D0	–
AE	®	A8	®
AF	-	F8	-
B0	°	FB	°
B1	±	B1	±
B2	²	32	²
B3	³	33	³
B4	´	AB	´
B5	µ	B5	µ
B6	¶	A6	¶
B7	•	E1	•
B8	/	FC	¸
B9	¹	31	¹
BA	º	BC	º
BB	»	C8	»
BC	¼	2A	*
BD	½	2A	*
BE	¾	2A	*
BF	¿	C0	¿
C0	À	CB	À
C1	Á	E7	Á
C2	Â	E5	Â
C3	Ã	CC	Ã
C4	'A'	80	Ä
C5	Ä	81	Å
C6	Æ	AE	Æ
C7	Ç	82	Ç
C8	È	E9	È
C9	É	83	É
CA	Ê	E6	Ê
CB	Ë	E8	Ë
CC	Ì	ED	Ì
CD	Í	EA	Í
CE	Î	EB	Î

ISO 8859-1-to-Macintosh Translation Table (Continued)

ISO 8859-1		Receiving Macintosh	
Hex Value	Character	Hex Value	Character
CF	İ	EC	İ
D0	Đ	44	D
D1	Ñ	84	Ñ
D2	Ò	F1	Ò
D3	Ó	EE	Ó
D4	Ô	EF	Ô
D5	Õ	CD	Õ
D6	'O'	85	Ö
D7	×	78	x
D8	Ø	AF	Ø
D9	Ù	F4	Ù
DA	Ú	F2	Ú
DB	Û	F3	Û
DC	'U'	86	Ü
DD	Ý	59	Y
DE	Þ	DE	fi
DF	ß	A7	ß
E0	à	88	à
E1	á	87	á
E2	â	89	â
E3	ã	8B	ã
E4	ä	8A	ä
E5	å	8C	å
E6	æ	BE	æ
E7	ç	8D	ç
E8	è	8F	è
E9	é	8E	é
EA	ê	90	ê
EB	ë	91	ë
EC	ì	93	ì
ED	í	92	í
EE	î	94	î
EF	ï	95	ï
F0	ð	64	d
F1	ñ	96	ñ
F2	ò	98	ò
F3	ó	97	ó

ISO 8859-1-to-Macintosh Translation Table (Continued)

ISO 8859-1		Receiving Macintosh	
Hex Value	Character	Hex Value	Character
F4	ô	99	ô
F5	õ	9B	õ
F6	ö	9A	ö
F7	÷	D6	÷
F8	ø	BF	ø
F9	ù	9D	ù
FA	ú	9C	ú
FB	û	9E	û
FC	ü	9F	ü
FD	ý	79	y
FE	þ	DF	fl
FF	ÿ	D8	ÿ

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StarNine Technologies, Inc.
2550 Ninth Street, Suite 112
Berkeley, CA 94710 USA

Tel: 510-649-4949

Fax: 510-548-0393

Internet: info@starnine.com

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