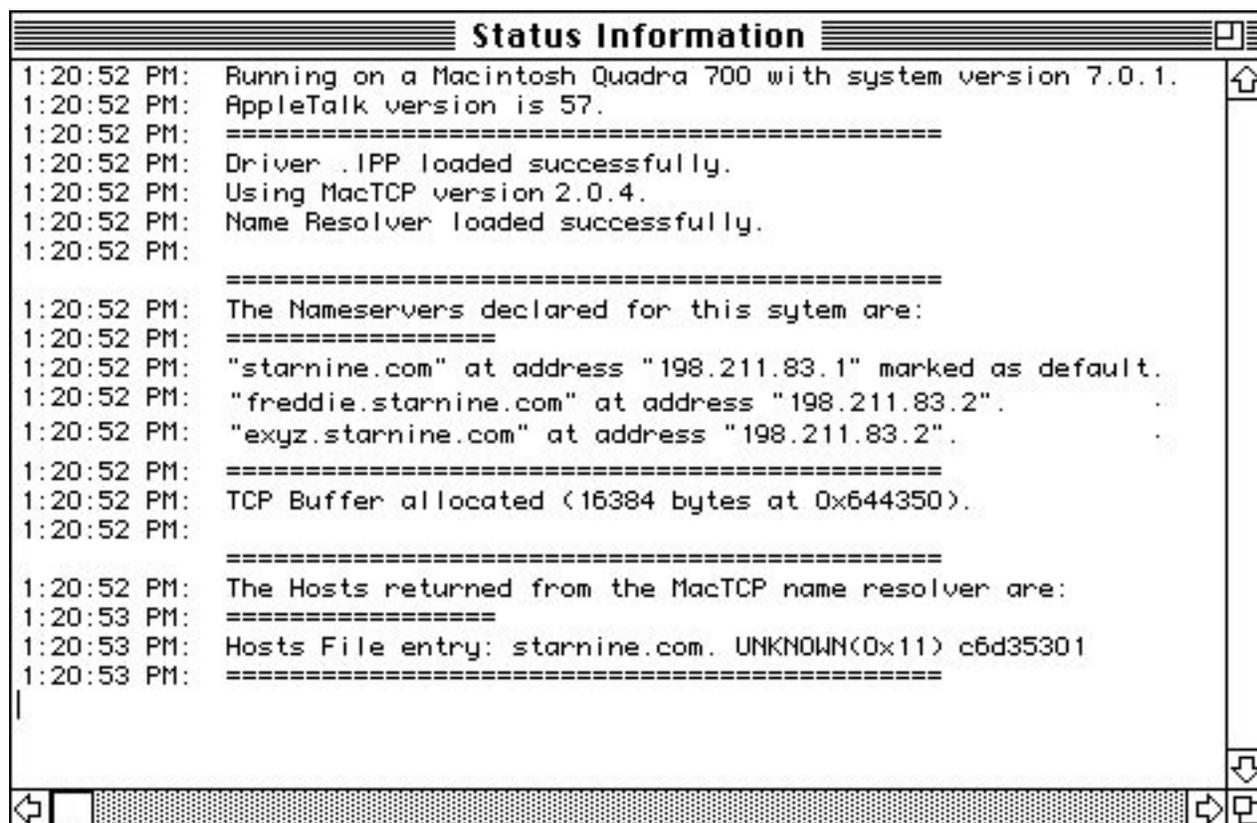# ML Test Administrator's Guide

Quarterdeck's ML Test application tests TCP/IP and SMTP connectivity.

ML Test Status Window

To run ML Test, open the ADMIN folder and double-click ML Test. The initial status window contains messages about ML Test initialization. After reporting system information, ML Test loads the name resolver software specified in its own preferences configuration— "MacTCP Only" by default.

```
═══════════════════════════ Status Information ═══════════════════════
1:20:52 PM:  Running on a Macintosh Quadra 700 with system version 7.0.1.
1:20:52 PM:  AppleTalk version is 57.
1:20:52 PM:  =============================================
1:20:52 PM:  Driver .IPP loaded successfully.
1:20:52 PM:  Using MacTCP version 2.0.4.
1:20:52 PM:  Name Resolver loaded successfully.
1:20:52 PM:
1:20:52 PM:  =============================================
1:20:52 PM:  The Nameservers declared for this sytem are:
1:20:52 PM:  =================
1:20:52 PM:  "starnine.com" at address "198.211.83.1" marked as default.
1:20:52 PM:  "freddie.starnine.com" at address "198.211.83.2".
1:20:52 PM:  "exyz.starnine.com" at address "198.211.83.2".
1:20:52 PM:  =============================================
1:20:52 PM:  TCP Buffer allocated (16384 bytes at 0x644350).
1:20:52 PM:
1:20:52 PM:  =============================================
1:20:52 PM:  The Hosts returned from the MacTCP name resolver are:
1:20:53 PM:  =================
1:20:53 PM:  Hosts File entry: starnine.com. UNKNOWN(0x11) c6d35301
1:20:53 PM:  =============================================
```

After loading the name resolver, ML Test reads the MacTCP configuration and reports the DNS servers listed there. For example:

```
=============================================
The Name servers declared for this system are:
=============================================
"starnine.com" at address "198.211.93.1" marked as default.
"freddie.starnine.com" at address "198.211.93.2".
"exyz.starnine.com" at address "198.211.93.3".
=============================================
```

Because the "MacTCP Only" name resolver is loaded by default, ML Test opens the MacTCP Hosts file in the System Folder after reading the DNS configuration in MacTCP, and reports the systems configured there.

ML Test Name Resolution

To reconfigure the ML Test name resolver preference, choose Preferences in the Edit menu. Then, open the Name Resolver pop-up menu.

> **Note:** The name resolution method you select in the ML Test application is independent of the name resolution method you select in a Quarterdeck gateway or server product. However, to test the SMTP connectivity of a gateway or server, you should use the same name resolution method in that product and in ML Test.

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. See the section on SMTP/TCP network parameters in the *Administrator's Guide* for details. After you choose the appropriate name resolver , click OK.

When multiple DNS servers are configured in MacTCP and ML Test sends a query, which one of the servers receives the query depends both on the MacTCP configuration and the hostname on which the query is performed.

- If the hostname includes a domain name that matches a domain name in MacTCP, the lookup is sent to that server.

- If there are multiple servers servicing the same domain, the query will be sent to the first server listed in MacTCP.

   For example, suppose MacTCP has these three addresses specified for one domain:

   ```
   Starnine.com198.211.93.1
   starnine.com198.211.93.222
   starnine.com198.211.93.234
   ```

   If you initiate a lookup on "starnine.com," the request will be sent to 198.211.93.1.

- If there are multiple domain name matches, the query will be sent to the best match.

   For example, if MacTCP has these servers specified:

   ```
   host1.starnine.com198.211.93.2
   host10.starnine.com198.211.93.4
   starnine.com198.211.93.1
   ```

   and you initiate a lookup on "unix.host1.starnine.com," the request will be sent to 198.211.93.2. If you look up "host10.starnine.com," the request is sent to 198.211.93.4.

- If no match occurs, the lookup is sent to the default DNS server.

The example lookups below use the following DNS configuration in MacTCP:

```
host1.starnine.com198.211.93.2 -- marked as default
host2.starnine.com198.211.93.3
host10.starnine.com198.211.93.4
starnine.com198.211.93.1
```

The following queries will be routed as described:

- If the name "starnine.com" is specified, the query is sent to 198.211.93.1.

- If the name "host2" is specified, the query is sent to the default DNS server, 198.211.93.2.

- If the name "host2.starnine.com" is specified, the query is sent to 198.211.93.3.

- If the name "host10.starnine.com" is specified, the query is sent to 198.211.93.4, since the "longest match" in this case is "host10.starnine.com".

- If the name "nasa.gov" is specified, the query is sent to the default DNS system, since there is no domain name match.

Sending a Test Message

To test an SMTP transaction with a host, choose Send from the Test menu (or press Command-s). This dialog opens:

- TO Hostname

  Type the name of a host on the local network, such as the default host. If the hostname does not contain a domain name, the domain name specified as the MacTCP default domain name will be appended to the hostname. If there are one or more periods in the hostname, ML Test assumes that a domain name is present in the hostname and will not append the default domain name.

- MY Hostname

  Most SMTP systems accept the default "Testing" hostname in this field, but in some cases you need to modify this field to contain a real hostname to use ML Test successfully.

- TO User Name

  Leave the default "postmaster" or type your login name on the specified host. This field must contain the name of a real user on the specified system or ML Test will fail.

- FROM User Name

  Normally, this field is not checked during SMTP transactions.

To execute a test, follow these steps:

1 Type the name of a host in the "TO Hostname" field.

2 Click Send.

ML Test reports each action in the status window, and then reports on its success or failure. A successful test indicates that the transaction occurred properly, so the network configuration is probably correct.

▲ *Important*: If the ML Test status window shows a protocol transaction occurring but the test does not work successfully, you probably need to modify one or more of the default values in the Send window. Look for an error flagged with a "5*xx*" code, e.g., 501 or 550. The line preceding that error code should indicate which of the parameters was not accepted (hostname, user name, or "From" user name). You can then modify that field to contain the information needed by the receiving machine, such as a fully qualified domain name, and execute the Send command again.

Messages like these should appear in the status window:

```
Starting connection test for host: starnine
##### Sending Mail File #####
Sending D.ml.out.1938 to starnine
+++++++++++ MacTCP nameresolver on "starnine"
Contacting NameServer for IP Address of starnine.
Attempting to connect to IP Address; IP Address: 198.211.93.1
Ping time = 13
+++++++++++
Got: '220 starnine.starnine.com Sendmail 5.64/SMI-3.2 ready at Mon, 18 Apr 94
12:05:36 PDT'
Expected:'220'
Sending: helo testing
Got: '250 starnine.starnine.com Hello testing ([128.1.5.127]), pleased to meet
you'
Expected:'250'
Sending: mail from:<Mail*Link>
Got: '250 <Mail*Link>... Sender ok'
Expected:'250'
Sending: rcpt to:<postmaster@starnine>
Got: '250 <postmaster@starnine>... Recipient ok'
Expected:'25'
Sending: data
```

```
Got: '354 Enter mail, end with "." on a line by itself'
Expected:'354'
Sending: ?.
Got: '250 Ok'
Expected:'250'
Sending: quit
Got: '221 starnine.starnine.com closing connection'
Expected:'221'
End of connection test for host: starnine
==============================================
```

Including Data in the Test Message

ML Test allows you to select a portion of the output displayed in the status window (or all of it via "Select All" in the Edit menu). The selected output will be appended to the normal test message that is sent when you click the Send button.

Error Messages Reported

If errors occur,

- Check the Error Messages described in *ML Test Error Messages*.

- Review your MacTCP configuration, and make sure that the Macintosh has a legal IP address on the local network.

- Review your DNS configuration.

Generating a DNS Lookup

ML Test generates its name server requests via the TCP (not UDP) protocols. The Lookup command generates a lookup request to a domain name server and prints the response records. To use this command, one or more DNS servers must be configured in the MacTCP Control Panel. See *ML Test Name Resolution* for more details.

Sending the Lookup

To look up a system name in DNS, choose Lookup in the Test menu. This dialog opens:
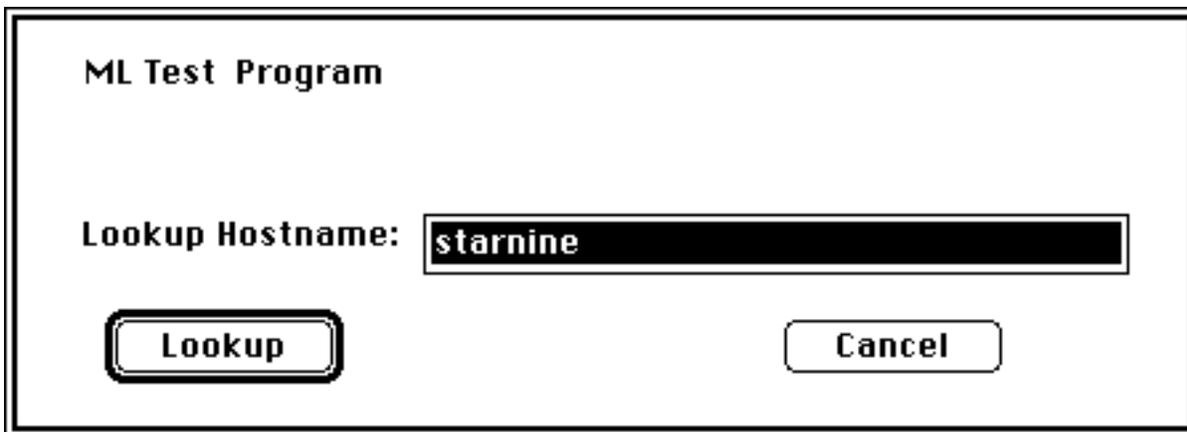
Note: You can also open this dialog by clicking the Lookup button in the Send dialog, in which case the host name displayed in the Lookup dialog will be the *same host name* specified in the "TO Hostname" field and changing the hostname in one dialog changes it in the other.

Type the hostname and click Lookup.

If the hostname does not contain a domain name, the domain name specified as the MacTCP *default* domain name will be appended to the hostname. If there are one or more periods in the hostname, the default domain name is not appended.

Information Requested and Returned in a Lookup

Generating a DNS lookup causes the following actions:

- ML Test invokes the name resolver software (see *ML Test Name Resolution*).

- The name resolver asks the domain name server for *all* records for the specified host (the hostname you entered in the "TO Hostname" field).

  Note that the Lookup request is a "wild card" request, which asks the domain name server to return all information known about the specified system.

- The name resolver decodes the domain name server's response and ML Test displays the Response Record (RR) fields in the status window.

  See RFC 1035 for a full explanation of these fields.

Each response record (RR) contains four fields:

- QUESTION field

  The original question generated by the name resolver, which is *not* displayed in the status window.

- ANSWER fields

  The answer to the question.

- AUTHORITY fields

  An optional pointer to the authoritative name server for this request.

- ADDITIONAL fields

  Under normal circumstances, the answer to the name resolver query will be returned in the ANSWER field of the returned message. There are circumstances (such as an MX record query) when the name server will return information in the ADDITIONAL fields. This additional information is present to potentially keep the resolver software from generating another request.

If the necessary information cannot be obtained from a response, the name resolver software will generate another request based on the information returned. Up to three requests can be generated in an attempt to resolve a given address.

▲ *Important*: ML Test does *not* cache records. Each lookup generates a request to the domain name server.

Key to Response Records Displayed in the Status Window

In general, each response record is displayed in the format shown below. Non-italicized characters represent the literal character. Italicized words are defined in the list that follows.

>> type (*hostname*): *information*

- *type*

  This is a character sequence that represents the type of record received. These are the legal values for this field:

 | | |
  |---|---|
  | A | An IP address record |
  | NS | An authoritative name server record |
  | CNAME | A canonical name for the specified system |
  | SOA | Information on a zone of authority |
  | WKS | Well known services present on the named system |
  | PTR | A domain name pointer record |
  | HINFO | Information about the CPU type and OS on the named system |
  | MINFO | Mailbox or mail list information |
  | MX | The Mail EXchange system to be used |
  | TXT | Text only |
  | *number* | Other record types are displayed with the number that represents their code as defined in RFC 1035. |

- *hostname*

  This is the name of the host to which this records applies. This may be different from the hostname used in the lookup request.

- *information*

  The contents of this field are based on the type of record. See RFC 1035 for a description of the information returned for each RR type. See *Example ML Test Sessions* for examples.

Sending Ping Packets

To establish whether the Macintosh is able to communicate with the specified host at the simplest packet level, choose Ping in the Test menu. This dialog opens:

```
ML Test Program

Ping Hostname:  starnine

      Ping                            Cancel
```
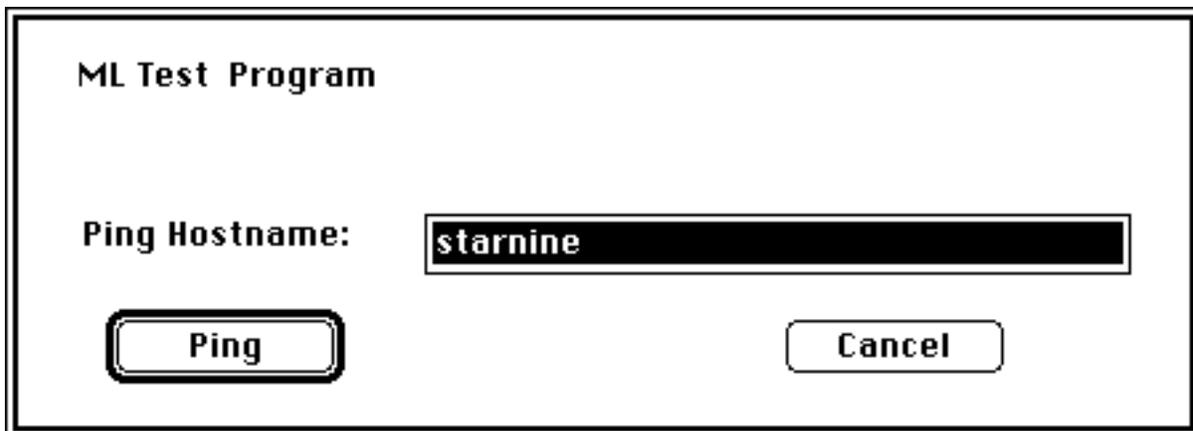
Type a system's host name and then click the Ping button. ML Test reports its actions and whether the Ping connection succeeded or failed.

If ML Test report success, it means that the Macintosh and host can communicate at the packet level. This indicates that the host is currently up and running, and that the IP network connection is okay.

Listing the Hosts File

To view the contents of the MacTCP Hosts file, choose Hosts in the Test menu. ML Test reads the Hosts file and displays the host names and IP addresses contained in that file in its status window.

Example ML Test Sessions

This section displays the results of three separate ML Test operations. The first two examples show the output generated by a Lookup. The third example shows the output generated by a Send.

Note: In the example output in the next sections, the generation and decoding of the lookup requests appears between the lines of solid pluses.

Lookup Request with MX Record Returned

The example transaction below shows a lookup on the hostname "smaug". This example returns an MX record in which the ADDITIONAL fields contain information that is used directly, eliminating the need for any further lookups.

```
      ++++++++++++++++++++++++++++++++++++++++++++++++++++
      ++++++++ Start nameServer query for "smaug"
      Query record type = 255 (WILDCARD).
      No domain name specified in "smaug". Looking up "smaug.starnine.com"
      Using default nameserver "starnine.com"
      Connecting to IP Address: 198.211.93.1 on socket: 53
      Connection closed.
      >>>>>>>> NameServer response: ANSWER fields <<<<<<<<
      >> MX(smaug.starnine.com): pref 20, host freddie20.starnine.com
      >> MX(smaug.starnine.com): pref 30, host freddie30.starnine.com
      >>>>>>>> NameServer response: AUTHORITY fields <<<<<<<<
```

```
         >> NS(starnine.com): host is starnine.starnine.com
         >>>>>>>> NameServer response: ADDITIONAL fields <<<<<<<<
         >> A(freddie20.starnine.com): address 198.211.93.12
         >> A(freddie30.starnine.com): address 198.211.93.30
         >> A(starnine.starnine.com): address 198.211.93.1
         Connection aborted.
         Returning IP addresses:
                 198.211.93.12
                 198.211.93.30
         ++++++++++++++++++++++++++++++++++++++++++++++++++
```

Three Lookup Requests Returning an IP Address

The example transaction below shows three lookup attempts before the proper IP address is obtained. The lookup is performed on the host name "mxtest". An explanation of the steps taken by this lookup request appears after the example.

```
         ++++++++++++++++++++++++++++++++++++++++++++++++++
         ++++++++ Start nameServer query for "mxtest"
         Query record type = 255 (WILDCARD).
         No domain name specified in "mxtest". Looking up "mxtest.starnine.com"
         Using default nameserver "starnine.com"
         Connecting to IP Address: 198.211.93.1 on socket: 53
         Connection closed.
         >>>>>>>> NameServer response: ANSWER fields <<<<<<<<
         >> MX(mxtest.starnine.com): pref 20, host alias1.starnine.com
         >>>>>>>> NameServer response: AUTHORITY fields <<<<<<<<
         >> NS(starnine.com): host is starnine.starnine.com
         >>>>>>>> NameServer response: ADDITIONAL fields <<<<<<<<
         >> A(starnine.starnine.com): address 198.211.93.1
         ML Lookup returned a hostname, but no IP address. Redoing!
         Connection aborted.
         ++++++++ Start nameServer query for "alias1.starnine.com"
         Query record type = 255 (WILDCARD).
         Using nameserver "starnine.com"
         Connecting to IP Address: 198.211.93.1 on socket: 53
         Connection closed.
         >>>>>>>> NameServer response: ANSWER fields <<<<<<<<
         >> CNAME(alias1.starnine.com): canonical name is test.starnine.com
         >>>>>>>> NameServer response: AUTHORITY fields <<<<<<<<
         >> NS(starnine.com): host is starnine.starnine.com
         >>>>>>>> NameServer response: ADDITIONAL fields <<<<<<<<
         >> A(starnine.starnine.com): address 198.211.93.1
         ML Lookup returned a hostname, but no IP address. Redoing!
         Connection aborted.
         ++++++++ Start nameServer query for "test.starnine.com"
         Query record type = 255 (WILDCARD).
         Using nameserver "starnine.com"
         Connecting to IP Address: 198.211.93.1 on socket: 53
         Connection closed.
         >>>>>>>> NameServer response: ANSWER fields <<<<<<<<
         >> A(test.starnine.com): address 198.211.93.222
         >> A(test.starnine.com): address 198.211.93.223
```

```
   >> A(test.starnine.com): address 198.211.93.224
   >> A(test.starnine.com): address 198.211.93.225
   >> A(test.starnine.com): address 198.211.93.226
   >>>>>>>> NameServer response: AUTHORITY fields <<<<<<<<
   >> NS(starnine.com): host is starnine.starnine.com
   >>>>>>>> NameServer response: ADDITIONAL fields <<<<<<<<
   >> A(starnine.starnine.com): address 198.211.93.1
   Connection aborted.
   Returning IP addresses:
          198.211.93.222
          198.211.93.223
          198.211.93.224
          198.211.93.225
   ++++++++++++++++++++++++++++++++++++++++++++++++++++
```

- The lookup is performed on the hostname "mxtest".

  This hostname does not contain a domain name, so the default domain name is appended to it.

  The name server returns an MX record with a system name of "alias1.starnine.com", but the IP address of this system is not given in the "ADDITIONAL fields" information.

- A second lookup is performed on the name "alias1.starnine.com."

  The response indicates that the system is a canonical name (alias) for the hostname "test.starnine.com".

  The ADDITIONAL fields still do not provide the IP address for this system, so another request must be generated.

- A third lookup is performed on "test.starnine.com".

  This request returns five addresses. However, the name resolver software can return a maximum of four addresses per name, so only the first four addresses are used. These IP addresses will be used sequentially until a connection is established with the specified system.

Sending a Test Message with Lookups

The example transaction below shows the output of a Send command. The first lookup request is for a record type of "MX". This request fails, so a lookup is generated for all known records for the system "starnine".

The second "wildcard" lookup returns the IP address, which is then used for the SMTP transaction (the Send).

```
   ==============================================
   Starting connection test for host: starnine
   ##### Sending Mail File #####
   Sending smtp.tmp.1566159125 to starnine
   ++++++++++++++++++++++++++++++++++++++++++++++++++++
   ++++++++ Start nameServer query for "starnine".
   Query record type = 15 (MX).
   No domain name specified in "starnine". Looking up "starnine.starnine.com"
   Using default nameserver "starnine.com"
   Connecting to IP Address: 198.211.93.1 on socket: 53
   Connection closed.
   Nameserver returned an error indication:
```

```
Server failure - The nameserver was unable to process this query.
Connection aborted.
ERROR:(2)Unable to get nameServer record.
+++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++ Start nameServer query for "starnine"
Query record type = 255 (WILDCARD).
No domain name specified in "starnine". Looking up "starnine.starnine.com"
Using default nameserver "starnine.com"
Connecting to IP Address: 198.211.93.1 on socket: 53
Connection closed.
>>>>>>>> NameServer response: ANSWER fields <<<<<<<<
>> A(starnine.starnine.com): address 198.211.93.1
>>>>>>>> NameServer response: AUTHORITY fields <<<<<<<<
>> NS(starnine.com): host is starnine.starnine.com
>>>>>>>> NameServer response: ADDITIONAL fields <<<<<<<<
>> A(starnine.starnine.com): address 198.211.93.1
Connection aborted.
Returning IP addresses:
198.211.93.1
+++++++++++++++++++++++++++++++++++++++++++++++++++
Connecting to IP Address: 198.211.93.1 on socket: 25
Got: '220 starnine.starnine.com Sendmail 5.59/SMI-3.2 ready at Mon, 18 Apr 94
10:15:40 PDT'
Expected: '220'
Sending: helo testing
Got: '250 starnine.starnine.com Hello testing, pleased to meet you'
Expected: '250'
Sending: mail from:<Mail*Link>
Got: '250 <Mail*Link>... Sender ok'
Expected: '250'
Sending: rcpt to:<postmaster@starnine>
Got: '250 <postmaster@starnine>... Recipient ok'
Expected: '25'
Sending: data
Got: '354 Enter mail, end with "." on a line by itself'
Expected: '354'
Sending:
Got: '250 Ok'
Expected: '250'
Sending: quit
Got: '221 starnine.starnine.com closing connection'
Expected: '221'
Connection closed.
End of connection test for host: starnine
==============================================
```

ML Test Error Messages

ML Test displays error messages in the status window and upon completing a "Send", displays a dialog box with the status of the test; for example:

ML Test: unable to open TCP connection.

OK

The following messages may be displayed in ML Test alert dialogs:

`ML Test unable to load driver`

This message will appear if the MacTCP driver cannot be found in the Control Panels folder within the System Folder or cannot be opened. It can also occur if a duplicate IP address is being used. If you are sure that the MacTCP software is where it should be and that you are using the right IP address for your Macintosh, quit ML Test, increase the amount of its application memory, and try the test again.

`ML Test unable to open stream`

Quit ML Test, increase the amount of its application memory, and try the test again.

`ML Test unable to open TCP connection`

This condition is a result of either a bad IP address, no physical media connection, or if the Macintosh is connected to LocalTalk, it could be the result of an incorrect DDP-IP gateway setup. Check the IP address you configured in the MacTCP area of the Control Panel. If this is a legal/unused address, then check all connections and any DDP-IP gateway setup. If everything seems to be in order but the TCP connection still cannot be established, try rebooting the Macintosh and DDP-IP gateway.

`ML Test unable to connect to SMTP host`

An error of this sort is due to a SMTP protocol issue. Either the Macintosh or the other SMTP host is not responding the way that the other machine expects.

`ML Test unable to send SMTP`

An error of this sort is due to a SMTP protocol issue. Either the Macintosh or the other SMTP host is not responding the way that the other machine expects.

`ML Test unable to close SMTP`

An error of this sort is due to a SMTP protocol issue. Either the Macintosh or the other SMTP host is not responding the way that the other machine expects and the connection was closed from one host without the other knowing it.

`ML Test unable to close connection`

The TCP connection was closed previously due to some other problem. This could be a break in the physical media or one of the SMTP hosts stopped talking.

`ML Test unable to create temporary files.`

This error happens when the disk that ML Test is running on is locked or out of space. Unlock the disk or free some space on the disk, whichever is needed.

`ML Test unknown failure.`

Some unknown error has occurred. Look at the error message displayed in the text of the window and correlate it with the error codes.

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