

C.1 Troubleshooting While Starting a SunATM Interface

There are many steps involved in making an interface active on an ATM network. Once you have configured the interface properly, these steps should be transparent to you. However, problems in your configuration may cause a failure at any number of points along the way. The following list contains checks you can make to determine where in the process your system failed, and what to do to remedy the situation. If you continue to experience problems, information gathered from these checks will help your service provider diagnose the problem.

This section is divided into three sub-sections:

Section	Description
Section C.1.1, "Generic Configuration"	Refers to all ATM configurations, regardless of the type of IP support involved, if any.
Section C.1.2, "Classical IP Configuration"	Refers only to interfaces configured to support Classical IP.
Section C.1.3, "LAN Emulation Configuration"	Refers to interfaces configured to support LAN Emulation.

C.1.1 Generic Configuration

- Make sure that there is an entry for the interface in `/etc/atmconfig`.

Configuration of an interface begins during system boot. Configuration will be attempted for all interfaces listed in `/etc/atmconfig`. For information about the format of this file, see Section 5.1, “Editing the `/etc/atmconfig` File,” on page 5-2, and the `atmconfig(4)` man page.

- Check to see if any error messages were printed during the boot process.

If there were error messages, see Section C.2, “Error Messages.”

- Verify linkstate in `qccstat(1M)`.

This command will indicate the signalling status of your interface. The linkstate should be `DL_ACTIVE`. If it is not, your interface is not communicating properly with your switch.

1. Make sure that your switch and interface are both configured to run the same version of UNI signalling.

The SunATM software supports UNI versions 3.0 and 3.1; the version is set per-interface in the `/etc/atmconfig` file.

2. Verify that your interface is physically connected to the switch, and that the switch sees the physical connection (most switches have a physical link LED for each port).

If your interface is a multimode fiber interface, one possible cause for a bad physical connection is that transmit and receive are swapped. “transmit” on your interface should be connected to “receive” on the switch, and “receive” on your interface to “transmit” on the switch. There is generally writing on one of the cables in a transmit-receive pair so that the two cables are distinct.

- Verify that an address has been registered with the switch.

The `qccstat(1M)` command also lists all addresses registered to the interface with the switch. See Section 6.1, “ATM Addresses and Address Registration,” on page 6-2, for more information about address registration. If there are no addresses registered, the `ilmid` daemon on your system is not communicating properly with the switch.

1. Verify that there are incoming packets on VC 16 using `atmstat(1M)`. If there aren't any incoming packets, the switch is not responding to ILMI requests, and you should check its ILMI configuration.
 2. Verify that there are outgoing packets on VC 16 using `atmstat(1M)`. If you do not see any outgoing packets on VC 16, your interface is not transmitting ILMI packets. Verify that `ilmid` is running on your system, and if necessary, start it in the background. Starting `ilmid` with the `-v` flag causes it to print a notice for every message received or transmitted, along with other diagnostic information.
- Interfaces that are not running Classical IP or LAN Emulation will not appear in the output of the `ifconfig` command.

`ifconfig(1M)` displays interfaces that have been configured for IP. In order to support IP, ATM interfaces must run either Classical IP or LAN Emulation. Therefore, an ATM interface that is not configured to support IP by running one of these two protocols will not be displayed by `ifconfig`.

C.1.2 Classical IP Configuration

- Check all of the generic configuration points.

These are issues that apply to all SunATM interfaces, so they must all be working in order for Classical IP to work.

- Verify the output of `ifconfig(1M)`.

Executing the command `ifconfig -a` should display the SunATM interface, `baN`, where *N* is the instance number.

1. If your interface does not appear, an error probably occurred during the boot process.

Check for error messages during the boot process. The meanings and possible solutions for error messages can be found in Section C.2, "Error Messages."

2. If your interface appears, but has incorrect information, verify your configuration files.

The information given to `ifconfig` comes from the `/etc/atmconfig` and `/etc/aarconfig` files. Check the entries in those files that apply to this interface and verify their contents. For descriptions of the file formats, see

Section 5.1, “Editing the `/etc/atmconfig` File,” and Section 5.3.1, “Editing the `/etc/lanconfig` File,” or the `atmconfig(4)` and `aarconfig(4)` man pages.

- Check the `setup_state` with `aarstat(1M)`.

This command will provide information about the Classical IP status on your interface. The `setup_state` refers to the completion of the `aarsetup` program.

1. If the `setup_state` is `setup-started`.

This indicates that the `aarsetup` program has not completed; it may be delayed by slow switch responses, or failed attempts to register ATM addresses in `/etc/aarconfig`. Make sure that the local address given for your interface in `/etc/aarconfig` is unique to this switch. Using `$myaddress` and the reserved server addresses is a good way to guarantee that all addresses are unique. After making any changes to `/etc/aarconfig`, run `aarsetup` again.

2. If the state is not `setup-started` or `setup-finished`.

Verify that the addresses and interfaces in `/etc/aarconfig` are valid, and run `aarsetup` again. If you see any error messages, check their meanings in Section C.2, “Error Messages.”

- Verify the `interface_state` in `aarstat(1M)`.

The `interface_state` is either `up` or `down`, and reflects the `linkstate` given in the output of `qccstat`. If the `linkstate` is `DL_ACTIVE`, the `interface_state` is `up`; otherwise, the `interface_state` is `down`. If `aarstat` indicates that the `interface_state` is `down`, try the suggestions for a `linkstate` that is not `DL_ACTIVE` given in Section C.1.1, “Generic Configuration.”

- Make sure Classical IP is configured correctly.

The `aarstat(1M)` output lists several parameters for Classical IP. The field `arpcsmode` lists whether Classical IP is running as a client, a server, or stand-alone (a client with no server configured). Verify that this is correct; if it is not, check your `/etc/aarconfig` file entries.

- If the system is a Classical IP client, verify the server connection.

On systems running in client mode, `aarstat` also provides information about the server. Verify the server address, and that the `server_state` is connected.

- If the `server_state` is no-connection or connecting.

The system is likely having a problem establishing a connection to the server. Verify that the server address is correct, and that there is a system on the network which has registered that address. The server and applicable switch ports must also be configured to support UNI signalling, also called Q.2931 or Q.93b.

- Verify that addresses are resolved and connections are made with the `ping(1M)` command.

Once you have two systems configured and running to this point, they should be able to `ping` each other. On `client1`, type: `ping client2`. You should receive a response, after a small delay, of `client2 is alive`.

If the `ping` is not successful:

1. Check that ARP requests are being sent to the server.
Find the `server_vci` in the output of `aarstat`. Then run `atmstat`, and verify that there are outgoing packets on that VC. If not, make sure that your interface is up and configured properly.
2. Make sure that you are receiving ARP responses from the server.
In the `atmstat` output, check the output packets for the server VC (found in the `aarstat` information). If none are being received, your server is not responding to ARP requests from the client. If it is a SunATM server, verify its Classical IP status with the suggestions given here. If not, verify that it is up and running as a server.
3. Make sure the address is resolved correctly.
Run the `atmarp` command for the system you are trying to `ping`, and verify that its IP address has been resolved to the correct ATM address. If not, make sure that the remote system is registering the correct address with the ATM ARP server. If the address has not been resolved at all, make sure that the remote system has a connection to the server.

4. Verify that a connection has been established between the two systems. The output of `qccstat` lists the source and destination addresses of all open connections. You should have at least one connection to the server, and you should also see a connection to the remote host you are trying to `ping`. If not, make sure both interfaces are up and registered with the switch, and that both interfaces and the switch are running UNI signalling (Q.2931 or Q.93b).
5. Check for IP problems. If the address has been resolved correctly, and a connection has been established between the two systems, but they still cannot `ping`, the problem is likely outside the scope of ATM.

C.1.3 LAN Emulation Configuration

- Check all of the generic configuration points.

These are issues that apply to all SunATM interfaces, so they must all be working in order for LAN Emulation to work.
 - Verify the output of `ifconfig(1M)`.

Executing the command `ifconfig -a` should display the ATM LAN Emulation interface, `laneN`, where *N* is the instance number.
1. If your interface does not appear, an error probably occurred during the boot process.

Check for error messages during the boot process. The meanings and possible solutions for error messages can be found in Section C.2, “Error Messages.”
 2. If your interface appears, but has incorrect information, verify your configuration files.

The information given to `ifconfig` comes from the `/etc/atmconfig` and `/etc/laneconfig` files. Check the entries in those files that apply to this interface and verify their contents. For descriptions of the file formats, see Section 5.1, “Editing the `/etc/atmconfig` File” and Section 5.3.1, “Editing the `/etc/laneconfig` File,” or the `atmconfig(4)` and `laneconfig(4)` man pages.

- Check the `setup_state` with `lanestat(1M)`.

This command will provide information about the LAN Emulation status on your interface. The `setup_state` refers to the completion of the `lanesetup` program.

1. If the `setup_state` is `setup-started`.

This indicates that the `lanesetup` program has not completed; it may be delayed by slow switch responses, or failed attempts to register ATM addresses in `/etc/laneconfig`. Make sure that the local address given for your interface in `/etc/laneconfig` is unique to this switch. Using the variable `$myaddress` for all systems is a good way to guarantee that all addresses are unique. After making any changes to `/etc/laneconfig`, run `lanesetup` again.

2. If the state is not `setup-started` or `setup-finished`.

Verify that the addresses and interfaces in `/etc/laneconfig` are valid, and re-run `lanesetup`. If you see any error messages, check their meanings in Section C.2, “Error Messages.”

- Verify that a connection has been made to the LAN Emulation server (LES).

A LAN Emulation client must establish and maintain a connection to the LES. In most cases, the LES will also establish and maintain a second connection to the client. Find the LES address in the output of `lanestat`, and then look for connections with that address as the destination or source in the output of `qccstat`.

If you do not see any connections with that address:

1. If you have an LAN Emulation configuration server (LECS):

Make sure that the correct address is configured for the LECS. By default, the ATM Forum well-known address will be used by the SunATM software. If your LECS uses a different address, you should enter the alternate address in the `/etc/laneconfig` file. See Section 5.3.1, “Editing the `/etc/laneconfig` File,” for information on editing `/etc/laneconfig`. You can check the address currently being used in the output of `lanestat`.

2. If you do not have an LECS:

One of the LECS functions is to provide the LES address, so if you do not have an LECS, you must provide the address. This is accomplished with an entry in `/etc/lanconfig`. See Section 5.3.1, “Editing the `/etc/lanconfig` File.” You can check the LES address currently being used in the output of `lanestat`.

3. Verify that the LECS, if present, and LES are configured properly.

- Verify that a connection has been made to the BUS.

In addition to the LES connection(s), a LAN Emulation client must also establish and maintain a connection to the BUS, and the BUS will typically establish and maintain a second connection to the client. You can find the BUS ATM address in the output of `lanestat`, and then verify that there is a connection with that address as the destination, and probably a second with that address as source, in the output of `qccstat`. If there are not any connections, verify that the BUS is configured properly.

- Verify that the host has joined the Emulated LAN

The `lanestate` field in the output of `lanestat` should indicate that the client is in the active state.

If your system is not able to join the emulated LAN, there may be a problem with the way in which your LAN Emulation Services are configured. If the Emulated LAN uses an MTU size larger than 9 kilobytes, the SunATM host will not join (9 Kbytes is the largest MTU size supported by the SunATM product). If the host is not able to join, an error message will be printed with an explanation.

- Verify that addresses are resolved and connections are made with the `ping` command.

Once you have two systems configured and running to this point, they should be able to `ping` each other. On `client1`, type `ping client2`. You should receive a response, after a small delay, of `client2 is alive`.

If the `ping` is not successful:

1. Check that the IP hostname or address is resolved to a MAC address.

LAN Emulation requires two address resolution steps to make a call. The first is to resolve an IP address to a MAC address. From the perspective of IP and ARP, this works exactly like it does on an ethernet interface; using

the `arp` command, you can verify that this resolution has been made correctly. If it has not, verify the connections to the BUS, and make sure data is being transmitted and received on the connection(s) to the BUS by finding the VC in the output of `qccstat`, and looking at the statistics for that VC in `atmstat`.

2. Check that the MAC address has been resolved to an ATM address. This is the second address resolution step, and is accomplished by the LAN Emulation software and communication with the LES. You can use the `lanearp` command to verify that MAC addresses have been properly resolved to ATM addresses. If it has not, verify the connections to the LES, and make sure data is being transmitted and received on the connection(s) to the LES by finding the VC in the output of `qccstat`, and looking at the statistics for that VC in `atmstat`.
3. Verify that a connection has been established between the two systems. The output of `qccstat` lists the source and destination addresses of all open connections. There you should see a connection to the remote host you are trying to `ping`. If not, make sure both interfaces are up and registered with the switch, and that both interfaces and the switch are running UNI signalling (Q.2931 or Q.93b).
4. Check for IP problems. If the address has been resolved correctly, and a connection has been established between the two systems, but they still cannot `ping`, the problem is likely outside the scope of ATM.

C.2 Error Messages

This section includes a list of some of the most common error messages you might see while configuring and bringing up your SunATM interface. For each message, there is a brief explanation of the problem and a possible solution.

C.2.1 Error Messages from S00sunatm

```
Cannot find ATM utilities in /etc/opt/SUNWatm/bin;  
exiting S00sunatm.
```

The SunATM utility directory `/etc/opt/SUNWatm/bin` does not exist. Make sure that the SUNWatm package installation completed successfully (see Section 3.2.4, “Checking the SunATM Software Installation Using `pkginfo`,” on page 3-6, for more information). If necessary, the package may need to be re-installed.

```
Cannot find atmconfig file in /etc; exiting S00sunatm.
```

The `/etc/atmconfig` file provides configuration information to the `S00sunatm` script so that it can bring up the SunATM interfaces during system boot. If the `/etc/atmconfig` file is not present, `S00sunatm` will print this warning message and exit. The `/etc/atmconfig` file is installed with the SUNWatm package as `/etc/atmconfig.template`; if you choose autoconfiguration or if no previous `/etc/atmconfig` file exists, `pkgadd` will copy this template file to `/etc/atmconfig`. If a previous `/etc/atmconfig` file exists, it will not be overwritten. See Section 5.1, “Editing the `/etc/atmconfig` File,” for more information on this file.

```
warning: can't plumb <device>; no UNI version provided
```

The first entry in `/etc/atmconfig` for a physical interface must include a UNI value in the second field.

```
warning: can't plumb <uni version> on <device>; <uni  
version> already plumbed
```

This message is printed when an entry is encountered which attempts to plumb a signalling version on an interface which has already been plumbed with a different signalling version. The script will ignore the new UNI version and continue processing the entry and the remaining entries in the file.

```
warning: can't plumb <lane instance>: too many lane
instances on <device>
```

A physical interface will support up to n lane instances, where n is the number of MAC addresses on the board (or 1 if the board has no MAC address). The number of MAC addresses on a board may be checked using the count option to the `atmgetmac(1m)` command. If an entry is encountered which attempts to plumb more LANE instances than allowed, this message will be printed; processing will continue with the next entry in the file.

```
warning: can't plumb signalling on <device>
warning: can't plumb classical IP interface <device>
warning: can't plumb <lane instance> on <device>
```

An error occurred when the script attempted to run `atmplumb(1m)`, either to plumb signalling, classical IP, or LAN Emulation on an interface, with information specified in `/etc/atmconfig`. The `atmplumb` program will generally print out an error message indicating why it failed; use that information to check your values in the `/etc/atmconfig` entry for device. The script will proceed to read and process the remaining entries in `/etc/atmconfig`, although further entries for the failed interface will not be processed correctly.

```
warning: invalid interface <lane instance>
```

The minor number provided in a logical interface name was not in the range 0 - 255. The script will proceed without attempting to configure the invalid lane device.

```
warning: only one classical ip hostname is allowed on
<device>
```

An additional entry was found containing a Classical IP hostname after an initial Classical IP hostname was already plumbed for device. Multiple Classical IP instances are not supported on a single physical interface. The script will ignore additional Classical IP information for a physical interface.

```
warning: <laneN> entry must appear before <laneN:X> entry
```

When using logical interface names, the first entry in `/etc/atmconfig` must always be either `laneN` or `laneN:0`, which are equivalent. All entries that appear before the `laneN` or `laneN:0` entry will be ignored.

Please install <SUNWatm>

A required software package is not installed on the system. Install the package, and reboot the system.

warning: extra fields for <device> will be ignored

There were additional fields in the `/etc/atmconfig` entry for the given device name. The script will proceed, ignoring the additional fields.

warning: duplicate entry <lane device>

There were multiple entries in `/etc/atmconfig` using the same LAN Emulation instance number. This is not a fatal error; the script will continue to run. However, only the first entry for each LAN Emulation instance number will be configured for LAN Emulation.

warning: not enough fields to configure <device>

The `/etc/atmconfig` entry for the given device did not have all the required fields. You must edit `/etc/atmconfig` file (see Section 5.1, “Editing the `/etc/atmconfig` File”), filling in all the appropriate information, and reboot the system. Empty fields should be indicated with a hyphen (-).

warning: ifconfig failed for classical IP
interface <device>

warning: ifconfig failed for <lane instance>

An error occurred when the script attempted to run `ifconfig` for the specified interface. You should see error messages printed by `ifconfig` indicating why it failed; use that information to check your values in `/etc/atmconfig`. In particular, verify that the hostname you provide in `/etc/atmconfig` appears in the `/etc/hosts` file on your system.

warning: invalid lane instance (<lane instance>) for
<device>

The lane instance number provided in `/etc/atmconfig` was not in the range 0 to 999. The script will proceed without attempting to configure the invalid lane instance.

```
warning: aarsetup failed; could not configure classical IP
interfaces
warning: lanesetup failed; could not configure LAN
Emulation interfaces
```

Either the LAN Emulation or the Classical IP startup script failed and exited with an error value. Check the error messages that were printed by `aarsetup` or `lanesetup`, and verify the values you have entered in `/etc/aarconfig` and/or `/etc/laneconfig`.

C.2.2 Error Messages from aarsetup and lanesetup

```
aarsetup: could not become control process
```

```
lanesetup: could not become control process
```

An instance of the setup program was running when another instance was started up. The second instance exits with this error message. Make sure that there is not a previous instance of the program still running. The setup program might take a while to complete if the switch is slow to respond.

```
aarsetup: could not open stream to Q93B
```

```
lanesetup: could not open stream to Q93B
```

The program was not able to communicate with the Q93B driver. Make sure that you run `aarsetup` or `lanesetup` as root, and that the `SUNWatm` package has been properly installed.

```
aarsetup: could not scan input file
```

```
lanesetup: could not scan input file
```

The program was unable to open the `/etc/aarconfig` or `/etc/laneconfig` file (or the file specified on the command line). Verify that the appropriate file exists, and has the proper permissions. Also make sure you run `aarsetup` or `lanesetup` as root.

```
aarsetup: exiting because of errors
```

lanesetup: exiting because of errors

Errors were encountered while parsing the `/etc/aarconfig` or `/etc/laneconfig` file, so the setup program cannot successfully complete. The error condition should be corrected, and then you should execute either `aarsetup` or `lanesetup`.

aarsetup: <interface> running as a server, but PVC-only 't' entries exist

The `aarsetup` program has found an *L* entry in `/etc/aarconfig`, meaning that this interface will be running as a server; however, there are table entries (*t* entries) containing only PVCs, which cannot be entered into the server's ATM ARP table. Verify your interface's status (server, client, or stand-alone), make sure all *t* entries include ATM addresses, and execute `aarsetup`. See Section 5.2.1, "Editing the `/etc/aarconfig` File," on page 5-4, for more information.

aarsetup: waiting for ilmid to provide prefix

lanesetup: waiting for ilmid to provide prefix

In some cases, the address registration process may take several minutes. In this case, `aarsetup` or `lanesetup` will print out this message to notify the user that it cannot complete until address registration completes. If the messages continue for more than a minute or two, verify your connection to the switch and that the switch and interface are both supporting ILMI.

undefined variable

A variable was used in a configuration file without being assigned a value with a `set` statement. Add a `set` statement, or correct the variable name, and run `aarsetup` or `lanesetup` again. See Section 5.2.2, "Using Variables in the `/etc/aarconfig` File," on page 5-8, and Section 5.3.2, "Using Variables in the `/etc/laneconfig` File," on page 5-18, for more information.

variable already defined

An attempt was made to set a variable which had been previously set in the same configuration file. Remove the second assignment and run `aarsetup` or `lanesetup` again.

variable name ill-formed

An attempt was made to create a variable in `/etc/aarconfig` or `/etc/lanconfig`, but the variable name was syntactically invalid. Variable names should be a combination of letters, digits, and underscores (`_`). Choose a conforming variable name and run `aarsetup` or `lanesetup` again.

variable name too long

An attempt was made to create a variable in `/etc/aarconfig` or `/etc/lanconfig`, but the variable name was greater than the maximum length (32 characters). Choose a variable name of less than 32 characters and run `aarsetup` or `lanesetup` again.

variable value too long

The value assigned to a variable in a configuration file was longer than the maximum value length of 128 characters. If a longer value is desired, try using a combination of variable names, with each value less than 128 characters. After correcting the variable value lengths, run `aarsetup` or `lanesetup` again.

`ifname: cannot join ELAN (frame size too large; please use a different ELAN and rerun lanesetup)`

The largest MTU size supported by the SunATM software is 9 kilobytes. If the LAN Emulation Services try to set a size larger than 9 Kbytes, the SunATM client will not be able to join the emulated LAN. Reset your LAN Emulation services to use an MTU size less than or equal to 9 kB, and rerun `lanesetup` to join the emulated LAN.

`ifname: frame-size change (please rerun lanesetup)`

The MTU size was changed by the LAN Emulation Services, and `lanesetup` must be rerun to notify IP of the change. There is a slight chance that TCP connections will remain open during this change, and if that is the case, performance on those connections will be impacted by the change. You should either restart the affected applications, or reboot the system if this becomes a problem.

<ifname> could not download the MAC address

This message indicates that an error occurred while `lanesetup` was attempting to retrieve a MAC address for the indicated interface. The most likely causes of such an error are that the kernel is out of memory, or that `atmplumb` has not been run for the specified interface.

Could not find driver for <ifname>

Each LAN Emulation interface is associated with an ATM driver when LAN Emulation is set up by `atmplumb`. This message indicates that this interface/driver association has not been made, most likely because `atmplumb` has not been run for the specified interface.

Not enough MAC addresses on <ATM interface>

The number of Emulated LANs which may be joined over a single physical interface is limited by the number of MAC addresses on the ATM interface board. This message indicates that an attempt was made to join more Emulated LANs than allowed by the number of MAC addresses on the specified interface. The number of MAC addresses on an interface may be found using the `count` option on the `atmgetmac(1M)` command; the number of Emulated LANs and lane instances indicated in `/etc/atmconfig` and `/etc/laneconfig` should not exceed this number. See Section 5.5, "Supporting Multiple Emulated LANS on a Single Interface."

C.2.3 Error Messages from the Kernel Drivers

```
q93b: warning: link coming back up on <interface>, but  
ilmid is not running
```

The link has gone down and come back up on an interface, but `ilmid` is not running at this time. This is a problem because addresses must be registered with the switch again, since both the interface and switch must clear out their address tables when the link goes down. Start `ilmid`; if the interface does not seem to be running properly after doing this, you may need to reboot the system. It is likely that the interface was in an unusual or unknown state when the link came back up, and may need to be taken down completely by rebooting.

