T1 Layer 1 Troubleshooting

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Introduction

This document describes the techniques and procedures to troubleshoot T1 Layer 1 problems. If T1 problems persist after you complete the procedures in this document, refer to T1 Error Events Troubleshooting and T1 Alarm Troubleshooting to isolate and correct your problem.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on Cisco IOS® Software Release 12.0(7)T.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Troubleshooting with the show controller t1 Command

The **show controller t1** command displays the controller status specific to the controller hardware. This information is useful for diagnostic tasks performed by technical support personnel. The Network Processor Module (NPM) or MultiChannel Interface Processor (MIP) can query the port adapters to determine their current status.

The **show controller t1** EXEC command also provides this information:

- Statistics about the T1 link. If you specify a slot and a port number, statistics for each 15 minute period are displayed.
- Information to troubleshoot physical layer and data link layer problems.
- Local or remote alarm information, if any, on the T1 line.

Most T1 errors are caused by incorrectly configured lines. Ensure that line coding, framing, and clock source

are configured in accordance to the recommendations of your Service Provider.

The T1 controller can be in three states:

- Administratively down
- Down
- Up

Administratively Down T1 Controller

The controller is administratively down when it has been manually shut down. Complete these steps in order to restart the controller to correct this error:

1. Enter enable mode.

   For example:

   ```
   maui-nas-03>enable
   Password:
   maui-nas-03#
   ```
2. Enter global configuration mode.

   For example:

   ```
   maui-nas-03#configure terminal
   Enter configuration commands, one per line. End with CNTL/Z.
   maui-nas-03(config)#
   ```
3. Enter controller configuration mode.

   For example:

   ```
   maui-nas-03(config)#controller t1 0
   maui-nas-03(config-controlle)#
   ```
4. Restart the controller.

   ```
   maui-nas-03(config-controlle)#no shutdown
   ```

Ensure the Line is Up

If the T1 controller and line are not up, ensure one of these messages appears in the **show controller t1** EXEC command output:

```
Receiver has loss of frame.
or
Receiver has loss of signal.
```

Loss of Frame

Complete these steps if the receiver has loss of frame:

1. Ensure the framing format configured on the port matches the framing format of the line. Check the framing format of the controller from the running configuration or the **show controller t1** command output.

   Issue the **framing {SF | ESF}** command in controller configuration mode in order to change the framing format. For example:

```
maui-nas-03#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
maui-nas-03(config)#controller t1 0
maui-nas-03(config-controlle)#framing esf
```

2. Try the other framing format to see if the alarm clears.
3. Issue the **cablelength long** or **cablelength short** command in order to change the line build−out (LBO) setting.

   LBO compensates for the loss in decibels based on the distance from the device to the first repeater in the circuit. A longer distance from the device to the repeater requires that the signal strength on the circuit be boosted to compensate for loss over that distance.

   Issue the **cablelength long** controller configuration command in order to configure transmit and receive levels for a cable length (line build−out) longer than 655 feet for a T1 trunk with a channel service unit (CSU) interface. Issue the **cablelength short** controller configuration command in order to configure transmit attenuation for a cable length (line build−out) of 655 feet or shorter for a T1 trunk with a DSX−1 interface.

   Contact your Service Provider and refer to Configuring Serial Interfaces for more information on build−out settings.

   If this does not fix the problem, see the Loss of Signal section.

Loss of Signal

Complete these steps:

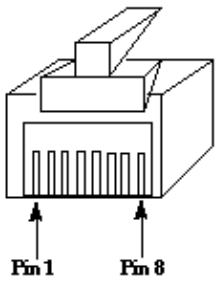
1. Ensure the cable between the interface port and the T1 Service Provider equipment or T1 terminal equipment is connected correctly.

   Ensure the cable is hooked up to the correct ports. Correct the cable connections if necessary.
2. Check the cable integrity by looking for breaks or other physical abnormalities in the cable.

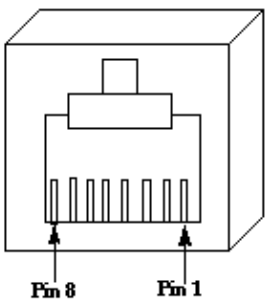
   Ensure the pinouts are set correctly. Replace the cable if necessary.
3. Check the cable connectors. A reversal of the transmit and receive pairs or an open receive pair can cause errors.

   The receive pair should be on lines 1 and 2, and the transmit pair should be on lines 4 and 5.

   The pins on a RJ−45/48 jack plug are numbered from 1 through 8. With the metal pins facing toward you, pin 1 is the left−most pin. This figure shows the pin numbering on an RJ−45 jack:



RJ-45 Jack Plug



RJ-45 Jack Face

4. If you have completed all of these steps and you still experience problems, use a rollover cable.

Issue the **show controller t1** EXEC command after each step in order to see if the controller exhibits any errors.

Loopback Mode

Ensure the line is in loopback mode from the **show controller t1** command output. The line should be in loopback mode only for testing purposes.

Issue the **no loopback** command in controller configuration mode in order to turn off loopback. For example:

```
maui-nas-03(config-controlle)#no loopback
```

Refer to Loopback Tests for T1/56K Lines for information on how to perform a hard plug loopback test in order to verify that the T1 controller and card operate correctly.

If the steps discussed in this document do not solve the T1 problem, refer to T1 Error Events Troubleshooting, T1 Alarm Troubleshooting, and T1 PRI Troubleshooting.

Related Information

- **T1 Error Events Troubleshooting**
- **T1 Alarm Troubleshooting**
- **T1 PRI Troubleshooting**
- **T1/E1 Controller Commands**
- **Serial Port and T1/E1 Trunk Configuration**
- **Configuring Channelized E1 and T1**
- **Dial and Access Support Page**
- **Technical Support & Documentation − Cisco Systems**

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