

T1 Error Events Troubleshooting

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Introduction

This document describes various error events that occur on T1 lines and provides troubleshooting information to fix these errors. Most common T1 problems can be solved by using this document in conjunction with the T1 Layer 1 Troubleshooting, T1 Alarm Troubleshooting, and T1 PRI Troubleshooting documents.

Before You Begin

Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

Prerequisites

There are no specific prerequisites for this document.

Components Used

This document is not restricted to specific software and hardware versions.

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Using the Counters

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 the following:

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

Use the **show controller** command to see if there are alarms or errors displayed by the controller. To see if the framing, line coding, and slip seconds error counters are increasing, use the **show controller t1** command repeatedly. Note the values of the counters for the current interval.

Contact your Service Provider for framing and line coding settings. It is common to use binary 8-zero substitution (B8ZS) line coding with Extended Super Frame (ESF), and alternate mark inversion (AMI) line coding with Super Frame (SF).

Slip Secs Counter Increasing

If slips are present on the T1 line, there is a clocking problem. The Customer Premises Equipment (CPE) will need to synchronize to the clocking from the T1 provider (telco). Complete the following steps to correct this problem:

1. Ensure the clock source is derived from the telco. In the **show controller t1 EXEC** command output, ensure the `Clock Source is line primary`.

Note: If there are multiple T1s coming into an access server, only one can be the primary source. The other T1s derive the clock from the primary source. If there are multiple T1s, ensure the T1 line designated as the primary clock source is configured correctly. You may also configure a second T1 line to provide clocking in case the primary source goes down. To do this, use the **clock source line secondary** command from controller configuration mode.

2. Set both the primary and secondary T1 clock source from controller configuration mode. For example:

```
maui-nas-03(config-controller)#clock source line primary
```

and

```
maui-nas-03(config-controller)#clock source line secondary 1
```

Ensure that the T1s that you specify as the primary and secondary are both active and stable. For more information on clock source refer to the document *Clock Synchronization for AS5xxx Network Access Servers*.

Note: On certain platforms (AS5350,AS5400,AS5800 etc.) the clock source is specified using the **dial-tdm-clock** command. Refer to the Command Lookup Tool for more information. This tool, along with other Cisco TAC Tools, is found in Tools and Utilities.

Framing Loss Seconds Increasing

Follow these steps:

1. Ensure the framing format configured on the port matches the framing format of the line. Look for `"Framing is {ESF|SF}"` in the **show controller t1** output.
2. To change the framing format, use the **framing {sf | esf}** command in the controller configuration mode. For example:

```
maui-nas-03(config-controller)#framing esf
```

3. Change the line build-out using the **cablelength long** or **cablelength short** command.

Contact your Service Provider and consult the T1/E1 Controller Commands documentation for details on build-out settings.

Line Code Violations Increasing

Follow these steps:

1. Ensure the line coding configured on the port matches the line coding of the line. Look for Line Code is {B8ZS|AMI} in the **show controller t1** output.
2. To change the line coding, use the **linecode {ami | b8zs}** command in controller configuration mode. For example:

```
maui-nas-03(config-controller)#linecode b8zs
```

3. Change the line build-out using the **cablelength long** or **cablelength short** command.

Contact your Service Provider and consult the T1/E1 Controller Commands documentation for details on build-out settings.

Path code violations are frame synchronization errors for SF, and cyclic redundancy check (CRC) errors for ESF. Path code violations and line code violations are typically present simultaneously. Always verify that your line coding is correct.

Path Code Violations Increasing

A Path code violation error event is a frame synchronization bit error in the D4 (SF) format, or a CRC error in the ESF format. Path code violations and line code violations are typically present simultaneously. Always verify that your line coding is correct.

1. Ensure the line coding configured on the port matches the line coding of the line. Look for "Line Code is {B8ZS|AMI}" in the **show controller t1** output.
2. To change the line coding, use the **linecode {ami | b8zs}** command in controller configuration mode. For example:

```
maui-nas-03(config-controller)#linecode b8zs
```

3. Change the line build-out using the **cablelength long** or **cablelength short** command.

Contact your Service Provider and consult the T1/E1 Controller Commands documentation for details on build-out settings.

Verifying the isdn switch-type and pri-group timeslots Configuration

Use the **show running-config** command to ensure that **isdn switch-type** and **pri-group timeslots** are configured correctly. To specify the central office switch type on the ISDN interface, use the **isdn switch-type** global configuration command. Options for this command include **primary-5ess**, **primary-dms100**, and **primary-ni**. Contact your Service Provider for the correct values to use.

Note: If you have defined ISDN pri-groups and channel groups on the same controller, ensure that you do not overlap time slots or use the ISDN D-channel time slot in a channel group. Refer to Channelized E1 and Channelized T1 Setup Commands for more information regarding channel groups. When configuring a

Primary Rate Interface (PRI), use the **isdn switch-type** global configuration command to configure the switch type.

To configure the **isdn switch-type** and **pri-group**:

```
maui-nas-03#configure terminal
maui-nas-03(config)#isdn switch-type primary-5ess
maui-nas-03(config)#controller t1 0
maui-nas-03(config-controller)#pri-group timeslots 1-24
```

Verifying the Signaling Channel

If the error counters do not increase, but the problem persists, complete the following steps to verify that the signaling channel is up and configured correctly

1. Run the **show interfaces serial number:23** command, where the *number* is the interface number.
2. Ensure the interface is up. If the interface is not up, use the **no shutdown** command to bring the interface up. For example:

```
maui-nas-03#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
maui-nas-03(config)#interface serial 0:23
maui-nas-03(config-if)#no shutdown
```

3. Ensure encapsulation is PPP. If not, use the **encapsulation ppp** command to set encapsulation. For example:

```
maui-nas-03(config-if)#encapsulation ppp
```

4. Ensure the interface is not in loopback mode. Loopback should be set only for testing purposes. Use the **no loopback** command to remove loopbacks. For example:

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

5. Power cycle the router.

If the problem persists, refer to some of the documents shown below then contact your Service Provider or the Cisco Technical Assistance Center (TAC).

Related Information

- [T1 Layer 1 Troubleshooting](#)
- [T1 Alarm Troubleshooting](#)
- [T1 PRI Troubleshooting](#)
- [Hard Plug Loopback Tests for T1/56K Lines](#)
- [T1/E1 Controller Commands](#)
- [Serial Port and T1/E1 Trunk Configuration](#)
- [Configuring Channelized E1 and Channelized T1](#)
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