

### **T1/PRI Troubleshooting Guide**

#### T1/PRI Troubleshooting Guide Introduction:

This document covers the troubleshooting steps for common T1/PRI issues that you are likely to encounter in the field. While most issues we encounter turn out to be problems on the carrier side, the carrier will likely tell you that most problems they see are on the PBX side. This makes sense as T1/PRI circuits generally are very reliable and trouble free, and many PBX's require extensive setup to configure the circuit. Fortunately AltiGen T1/PRI configuration is about as close to plug and play as you see in the telecom industry. Since our T1 boards are also very reliable, your role in troubleshooting a T1/PRI circuit usually comes down to helping the carrier technicians identify the problem with their circuit. In the rare case of a board failure, AltiGen's diagnostic software can typically identify a defective board within a few minutes.

If you suspect a physical board failure or bus/installation related problem, please consult the General Board Troubleshooting Guide first.

#### Troubleshooting Steps:

Before making any changes to the board configuration or opening a ticket with either AltiGen or the carrier, try to find out as much as you can about the failure. It is beyond the scope of this document to cover T1 signaling and all of the various alarm codes it is possible to see on a circuit, so we will focus on the few issues that we see again and again in the field. Most failures will fall into one of these categories. Physical connection issues (cabling, smart jack, extended demarc etc.), Protocol/signaling/configuration issues (No D channel, excessive errors, frame slips) and very rarely defective hardware.

1. If the circuit and system have been installed for a while and the circuit suddenly goes down, it is most likely a carrier issue, first call the carrier and open a ticket.
2. Check the circuit for errors. If the T1/PRI board's connection to the circuit has been unplugged or completely broken, you will usually notice line code errors counting up, perhaps frame errors as well. If the circuit is connected but down, you may also see framing and bit errors.
3. Confirm the CT-BUS clock is set properly. For most cases, it should be set to Auto. See chapter 5, Gateway Management and Chapter 11, Board Configuration in the Administration Manual for details and exceptions. [Click here to go to our manual page and locate the Administration Manual for your version.](#)
4. Ask the carrier how the circuit should be configured, verify all settings are correct. The majority of PRI's will use B8ZS for Line Code, ESF for Frame Type, and will be configured as an NI-2 PRI with D channel as the last channel. Always double check with the carrier if you are not sure. If it is a new install and you have a spec sheet for the circuit, check with the carrier again. It is fairly rare, but carrier have been known to deliver a different type of circuit than was ordered. The tech turning up the circuit probably won't know what you were originally told the circuit would be, only what is on their order for the turnup. Make sure tie trunk and/or system clock master are not enabled, unless you have a special configuration.

5. Once the carrier has verified the circuit should be online, and any configuration issues are corrected, run the AltiGen Board Test Tool (and CT-BUS test if your chassis is not a MAX1000) to quickly rule out the possibility of a bad T1 board. This is very rare, but a board test only takes a few minutes. If the board tests okay, move on to troubleshooting the physical connection.

6. Systems with a fractional T1/PRI need to have the unused channels set to out of service. Check with the carrier to verify which channels are not used, and to verify which channel is the D channel (typically the last channel, even with fractional circuits).

#### Physical connection (Layer 1) issues:

Once you have completed the general troubleshooting steps, perform these additional steps for layer 1 issues. A circuit with a layer 1 problem will typically be in a red alarm state. In AltiAdmin in the trunk view, the T1/PRI trunks will show Not Ready. If you double click on the T1/PRI board in the board view, the span will have a red light and red explanation point, it may also say Local Alarm or Remote Alarm. If you double click the span, you will probably see errors counting up quickly. This indicates a Layer 1 (L1) failure. You will be troubleshooting the physical connection from the AltiGen system's T1/PRI board to the carrier, and verifying that the carrier has properly turned up the circuit.

1. Make a loop back plug. This is an essential tool for testing T1/PRI circuits, and is very easy to make. Simply take an RJ-45 plug, loop a wire from pin 1 to pin 4, and another from pin 2 to pin 5, crimp down the RJ-45 and you have a loop back plug.

2. If your client has a CSU (they should!) check the circuit by placing loop back on the CSU. You can test with the loop back plug on the CO side, then with it on the AltiGen side. If the circuit greens up when the CSU is looped back to the carrier, replace the cable from the CSU to the AltiGen server. If the circuit greens up (or at least goes to L2 failure in AltiAdmin instead of L1 failure), but the CSU indicates an alarm when looped to the carrier, try replacing the cable from the CSU to the smart jack. If that fails, bypass the CSU and connect the system directly to the smart jack/extended demarc. If the circuit greens up without the CSU but will not with it, the CSU is defective or misconfigured.

3. Ask the telco to run test pattern on the circuit, they may ask you to loop back the CSU, sometimes they can put their own equipment in loop back mode, but this will only test to the demarc, and not all the way to the CSU. If they can loop to their equipment but not the CSU, there may be a problem with the CSU or, more likely, the extension from the main telco closet to your smart jack/extended demarc.

4. If you still can't identify the issue, move the AltiGen server to the main telco closet and plug the T1 board directly into the NIU. Moving the server may be somewhat of a hassle, but it can help to quickly pinpoint the problem.

5. If the problem still can't be identified, you may ask the carrier to come onsite and perform a head to head test. They will send a technician with a piece of equipment called a T-BERD, which can connect to a T1 circuit and simulate the Telco or PBX, and run diagnostics. If possible, have the telco's technician do a head to head test at the NIU, smart jack/extended demarc and also directly connected to the AltiGen server.

#### Protocol/Configuration (Layer 2) issues:

Once you have completed the general troubleshooting steps, perform these additional steps for layer 2 issues. A circuit with a layer 2 problem will often show up in the board configuration with a green light and a red explanation mark, this indicates that Layer 1 is up, but there is no D channel. This typically indicates a configuration issue, or the carrier may have some issue with their equipment preventing the D channel from coming up.

1. Once the board has been tested and the circuit configuration has been confirmed, if the circuit is still down with a Layer 2 failure, ask the carrier to test the circuit. They will be able to run a test pattern on the circuit remotely, which may help them identify the issue, especially if the circuit is bouncing (coming up for a period of time, then going back down). Ask the carrier's tech if they are just looped up to their NIU, if so and they say the circuit is clean, place loop back at the smart jack/extended demarc or CSU, and ask them to test again.
2. If the carrier cannot identify the issue, ask them to rebuild the circuit. This can be done remotely, but the telco's technician may need to get assistance from someone else in their company.
3. If the problem still cannot be identified, escalate as needed. Contact Technical Support and open a case. Collect a trace and ask if Technical Support can identify the issue. You may also ask the carrier to dispatch a technician with a T-BERD to perform testing on site.

#### Other common T1/PRI related issues:

1. Can place/receive calls, but all fax/modem calls fail.

This may be a clocking issue. Check the errors on the circuit, if you see Xmit Frame Slips counting up at about 1 per second, but the circuit looks clean otherwise, make sure the board does not have System Clock Master checked in the Channel Group Configuration.

2. All of my trunks show critical error in the trunk view.

This is not a T1/PRI issue, but it may look like one at first glance. If you see this behavior, make sure your system is up to date, then contact Technical Support if updates do not resolve.

3. Can receive calls on your circuit, but outcalls return a fast busy.

Many carriers are becoming very strict on what outbound Caller ID is allowed on their circuits. Try setting the Outbound CID field on your extensions to the system main number. If the problem only occurs on forwarded or ONA calls, uncheck the box "Send Initiator's ID in ONA and Fwd call" on the System Configuration General tab.

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