



Quick Configuration Guide (QCG) TA 900/900e PRI Trunk Quick Start Guide

Overview

This Configuration Guide explains how to configure a T1 port on the Total Access 900/900e for a PRI to be connected to a PBX or other CPE device that requires an ISDN connection.

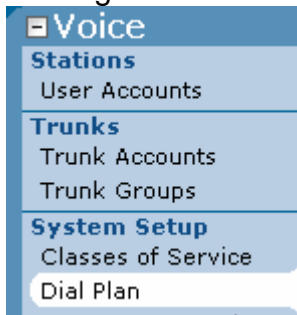
Requirements & Limitations

In the TA 900 series, only T1 port 0/2 can be used for a PRI connection. In the TA 900e series, T1 ports 0/3 and 0/4 can be used for PRI connections.

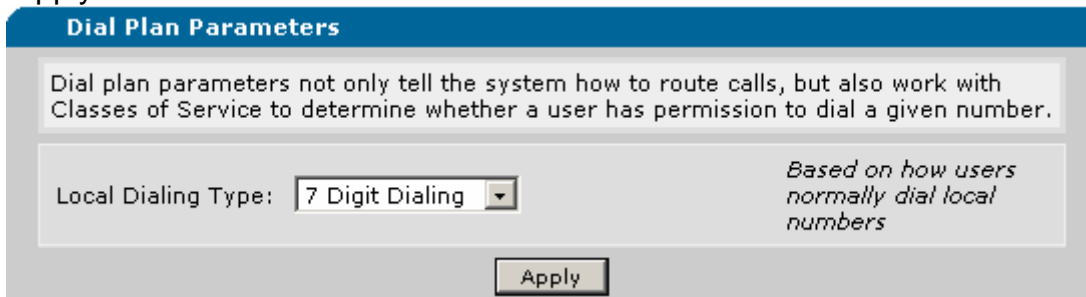
Web Interface Configuration

Configuring the Local Dialing Type

First, we must set the Local Dialing Type to 7 or 10 digits. To do this, begin by clicking on 'Dial Plan' under 'Voice'.

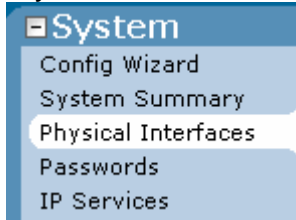


Then, select the appropriate 7 or 10 Digit Dialing for local calls and click on 'Apply'.



Configuring the T1 Interface

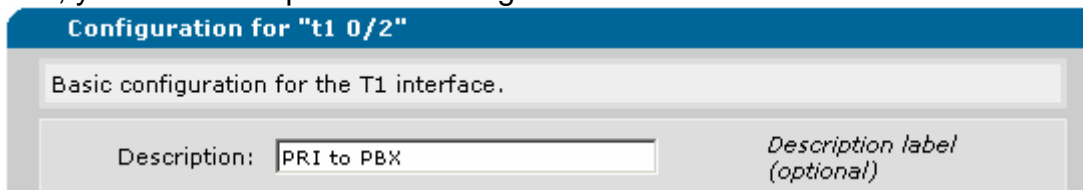
To begin configuring the T1 interface, click on 'Physical Interfaces' under 'System'.



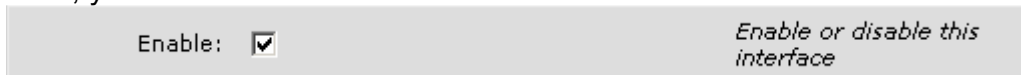
Next, click on 't1 0/2' under the 'Physical Interfaces' list.



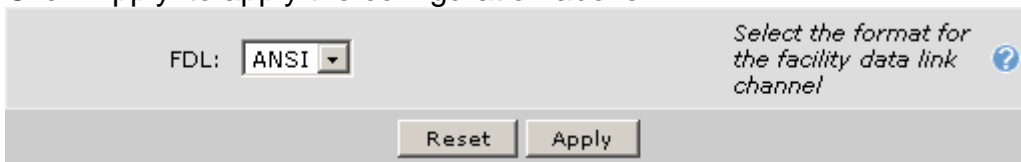
This will take you to the 'T1 0/2' Interface Configuration page. In the Description box, you have the option of entering a label for the interface.



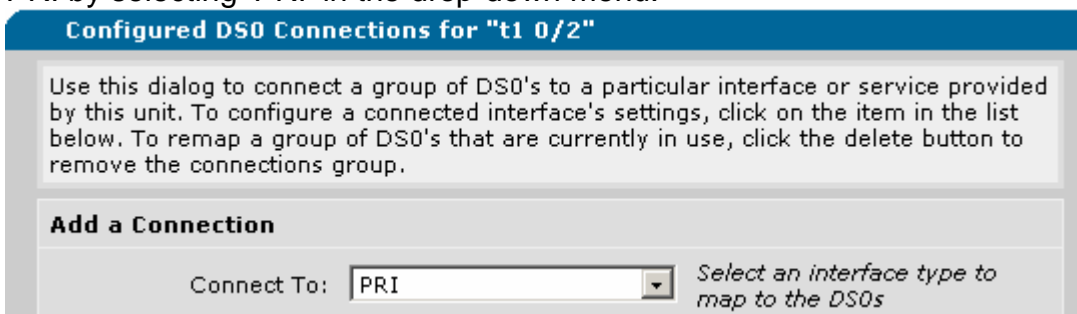
Next, you will want to check the 'Enable' box to enable the interface.



Click 'Apply' to apply the configuration above.



Since this will be a PRI interface, we want to connect the T1 0/2 interface to a PRI by selecting 'PRI' in the drop-down menu.



The 'Available DS0 Range' shows the DS0s on the T1 that are available for use.



Specify the appropriate DS0 range using the drop-down boxes. DS0 24 is automatically configured because it is the D-channel for the PRI. When finished, click on 'Add' to go to the 'PRI Configuration' page.

DS0 Range:	<input type="text" value="1"/> to <input type="text" value="23"/> + 24	<i>Set the range of DS0s to be mapped</i>
Speed:	<input type="text" value="64kbps"/>	<i>Select the speed for the DS0s being mapped</i>
<input type="button" value="Add"/>		

Configuring the PRI Interface

At the PRI Configuration page, you can specify appropriate PRI parameters. You can start by entering an optional description for the interface.

PRI Configuration

Basic configuration for PRI interface.

Description: [?](#)

Check the 'Enabled' box to administratively activate the interface.

Enabled: [?](#)

Use the drop-down box next to 'Switch Type' to configure the appropriate switch type to be used. You can choose from National ISDN 2, AT&T 4ESS, Lucent 5ESS, and Northern DMS-100.

Switch Type: [?](#)

Protocol Emulation specifies the role of the PRI interface. If connecting to a CPE device where the IAD is acting like the switch, this should be set to Network. If the IAD is acting as the CPE, this should be set to User.

Protocol Emulation: [?](#)

To send Caller ID Name over the PRI interface for inbound calls, the Name Delivery option must be configured. The options are 'Setup' (sends Caller ID Name in the original Setup message) and 'Proceeding' (sends Caller ID Name in a Call Proceeding message). Setting 'Presentation' to 'Allowed' configures the IAD to always send Caller ID Name.

Calling Party Options

Name Delivery: [?](#)

Presentation: [?](#)

Once finished, click on 'Apply' to apply the configuration changes.

Override:	<input type="text" value="None"/>	?
Override Number:	<input type="text"/>	?
Override Name:	<input type="text"/>	?
<input type="button" value="Cancel"/> <input type="button" value="Apply"/>		

Configuring the PRI Trunk

First, we will configure a Codec List to be used by the SIP trunk. To do this, click on 'Codec Lists' under 'Voice'.

- Voice**
- Stations
 - User Accounts
- Trunks
 - Trunk Accounts
 - Trunk Groups
- System Setup
 - Classes of Service
 - Dial Plan
 - ISDN Num Templates
 - SPRE Templates
 - Codec Lists**
 - System Parameters
 - Local SIP Server
 - SIP Client Locations
 - VoIP Settings

Click on the 'Add New Codec List' button to create a new Codec List.

Codec Lists

A codec list defines an ordered set of preferred codecs to use when engaging in a voice call.

Add New Codec List

Specify a name for the Codec List in the 'Codec List Name' field.

Add New Codec List

A codec list defines an ordered set of preferred codecs to use when an endpoint engages in a voice call.

Codec List Name: [?](#)

Specify the primary Codec to be used as 'Codec #1' and the secondary Codec to be used as 'Codec #2'. Once those are configured, click on 'Apply'.

Codec #1:	<input type="text" value="G.729"/>	?
Codec #2:	<input type="text" value="G.711 uLaw"/>	?
<input type="button" value="Cancel"/> <input type="button" value="Apply"/>		

Next, we need to create the PRI trunk. To do this, start by clicking on 'Trunk Accounts' under the 'Voice' tab.

- Voice**
- Stations
 - User Accounts
- Trunks
 - Trunk Accounts
 - Trunk Groups

Give the Trunk a name and make sure that 'Type' is set to ISDN. When finished, click on the 'Add' button.

Add / Modify / Delete Trunk Accounts

Use this page to add and configure trunk accounts.

Add a New Trunk Account

Trunk Name: [?](#)

Type: [?](#)

You will probably want to un-check the 'Reject External' box to allow trunk-to-trunk calls to work properly. Un-checking this box allows the PRI trunk to accept calls from other trunks that may be configured (i.e. E&M Wink or SIP). This command is necessary for deployments where more than one trunk is being used (i.e. a SIP trunk and a PRI trunk to the CPE).

Reject External: [?](#)

Select the appropriate ISDN Interface using the drop-down menu.

ISDN Settings

ISDN Interface: [?](#)

Select the appropriate Codec Group using the drop-down menu.

[Codec Group:](#) [?](#)

If you are going to have fax machines or modems behind the CPE device terminating the PRI, you will want to check the box next to 'Enabled' for 'Modem

Passthrough' to work. This will allow the fax machines and modems to work over the SIP network.

Modem Passthrough: Enabled ?
Detection Timespan: secs <0-8>

The 'DTMF Relay' options allow you to specify inband or out-of-band DTMF relay. This allows DTMF digits to be transmitted over the SIP network from the PRI. The default value is NTE 101, which is out-of-band digit transmission. Set this to 'Inband' if using inband DTMF relay.

DTMF Relay: Inband ?
 NTE Value: <96 - 127>

The 'RTP DSCP Value' configuration is used to specify the marking of RTP packets for QoS. The default is 46 and is usually appropriate for a deployment. If this should be changed for your application, you can specify a DSCP Value. When finished, click on 'Apply' to apply the configuration changes.

RTP DSCP Value: Use [Global Default](#): 46 ?
 Specified: <0 - 63>

Note: If the CPE device that is terminating the PRI is configured to accept a different amount of digits than is being received on the SIP trunk by the IAD (i.e. SIP provider is sending 10 digits and the PBX is configured for 4 digits), you will have to configure the PRI trunk to match and substitute numbers so call routing will work correctly. This is done under the 'DNIS Substitution' tab. The 'Match Number' is set as the original number that is received by the IAD and the 'Substitution Number' is the number sent out of the PRI trunk on an inbound call. You can put your mouse on the ? mark next to each entry to see the wildcards and characters that can be used.

VoIP Settings **DNIS Substitution**

Add New DNIS Substitution ?

Match Number: ?

Substitution Number: ?

Current DNIS Substitution Entries

Below is a list of the current DNIS substitutions. **NOTE:** Order is important as the list is processed from the top down. When a match is found, no other entries will be processed to see if it is a valid match.

Match Number	Substitution Number
There are no DNIS substitution in this account.	

Configuring the PRI Trunk Group

The last step is to create a trunk group for the PRI trunk. To start this process, click on 'Trunk Groups' under the 'Voice' tab.

Voice

- Stations**
 - User Accounts
- Trunks**
 - Trunk Accounts
 - Trunk Groups**
- System Setup**

Give the Trunk Group an appropriate name using the 'Group Name' field and then click 'Add'.

Add / Modify / Delete Trunk Groups

Use this page to add and configure trunk groups.

Add a New Trunk Group

Group Name: *Enter a name for this group.*

You can give the Trunk Group a description to help keep track of the configuration.

Edit Trunk Group 'PRI TO PBX'

Basic configuration for a Trunk Group. Click 'Apply' when done.

Trunk Group Information

Trunk Group Name: PRI TO PBX

Description:

To add the PRI trunk to the trunk group, click on the 'Add Members' button.

Trunk Group Members

Below is a list of [Trunk Accounts](#) that are being used in this Trunk Group.

Trunk Account	ID	Type	Supervision
There are no members configured for this Trunk Group.			

A new window will open with the available trunk accounts. Check the box under the 'Add?' column for the appropriate trunk account and then click on the 'Add Selected Trunks' button.

Add Members to Trunk Group

Click on one or more rows to select Trunk Accounts to add as members of this trunk group. **Hint: Use the Shift key to select ranges.**

Add?	Trunk Account	ID	Type	Supervision
<input type="checkbox"/>	T01	T01	SIP	SIP
<input checked="" type="checkbox"/>	PRI to PBX	T02	ISDN	ISDN

To configure calls to certain numbers to route out of the PRI trunk, click on the 'Configure Advanced Templates' button under the Call Templates section.

Detailed View - Permit/Restriction Call Templates ?

Permit Template	Cost
There are no configured Permit Templates	

Restriction Template
There are no configured Restriction Templates

?

A good rule of thumb is to be specific with trunks going to CPE devices and be general when creating call routing rules with trunks going to the PSTN/SIP

network. In this example, we have been assigned the number 256-555-1000 by the SIP provider and want to route that number out the PRI trunk. To do this, add the specific number to the 'Template' box and assign a 'Cost' of 0. When finished, click on 'Add'.

Add/Delete Override Templates

Use this form to add and delete specific outbound permit call templates.

Add Outbound Permit Template

Template: *All calls matching the specified pattern will be permitted*

Valid characters: 0-9, (,) - M N X [] \$

Cost: *Enter cost value between 0-499 for this template (optional)*

Once the Permit Template(s) have been verified, click on the 'Return to Trunk Group Config' button.

Restriction Template

There are no configured Restriction Templates

Click on the 'Apply' button to apply the configuration changes.

Detailed View - Permit/Restriction Call Templates

Permit Template	Cost
256-555-1000	Low (0)

Restriction Template

There are no configured Restriction Templates

Always remember to save your changes by clicking on 'Save' at the top of the Web GUI.



Command Line Interface Configuration

A PRI trunk is configured over a T1 interface. To begin, we must setup the T1 interface correctly and then connect it to the PRI interface.

Note: The configuration parameters used in the examples are for instructional purposes only. Please replace all underlined entries (i.e. **example**) with your specific parameters to configure your application.

Configuring the T1 Interface

First, you must create a TDM group. The following example creates a TDM group of 24 DS0s (Channels 1-24 at 64kbps each) on the T1 connection. You must specify the 24th channel in the TDM group so that it can be used as the D-channel for the PRI.

```
(config)#interface t1 0/2
(config-t1 0/2)#description PRI to PBX
(config-t1 0/2)#tdm-group 1 timeslots 1-24 speed 64
(config-t1 0/2)#no shutdown
(config-t1 0/2)#exit
```

Configuring the PRI Interface

After setting up the T1 interface, create a PRI interface. It is necessary to use the 'connect' command to connect the PRI interface to the appropriate T1 TDM group. You can specify Caller ID Name transmission using the 'isdn name-delivery' command. You can specify 'setup' or 'proceeding' to indicate which message in the PRI call setup the Caller ID Name should be transmitted in.

```
(config)#interface pri 1
(config-pri 1)#description PRI to PBX
(config-pri 1)#connect t1 0/2 tdm-group 1
(config-pri 1)#isdn name-delivery setup
(config-pri 1)#no shutdown
```

Configuring the ISDN Group

An ISDN group is necessary to connect the PRI interface to the voice trunk account. To do this, simply create an ISDN group and connect the appropriate PRI interface.

```
(config)#isdn-group 1
(config-isdn-group 1)#connect pri 1
```

Configuring the PRI Trunk

Step 1:

First, it is a good idea to create an appropriate Codec List to be used by the PRI trunk. In a Codec List, you can specify which codec should be prioritized by the

trunk when negotiating the call setup. In this example, a Codec List named 'Trunk' is going to be configured to use G.729 as the primary codec and G.711 as the secondary codec.

```
(config)#voice codec-list Trunk
(config-codec)#codec g729
(config-codec)#codec g711ulaw
(config-codec)#exit
```

Step 2:

Next, create the ISDN voice trunk using the 'voice trunk' command and specifying the type as isdn. An optional description can be given to the trunk as well using the 'description' command. The command 'no reject-external' allows the PRI trunk to accept calls from other trunks that may be configured (i.e. E&M Wink or SIP). This command is necessary for deployments where more than one trunk is being used (i.e. a SIP trunk and a PRI/RBS trunk to the CPE). Finally, connect the voice trunk to an ISDN group using the 'connect' statement.

```
(config)#voice trunk T02 type isdn
(config-T02)#description "PRI to PBX"
(config-T02)#no reject-external
(config-T02)#connect isdn-group 1
```

Note: If the CPE device that is terminating the PRI is configured to accept a different amount of digits than is being received on the SIP trunk by the IAD (i.e. SIP provider is sending 10 digits and the PBX is configured for 4 digits), you will have to configure the PRI trunk to match and substitute numbers so call routing will work correctly. This is done using the following command:

```
(config-T02)#match <input> substitute <input>
```

The first <input> is the original number that is received by the IAD and the second <input> is the number sent out of the PRI trunk on an inbound call. You can type a '?' after the 'match' or 'substitute' command to see the wildcards and characters that can be used.

Step 3:

Since this is a voice trunk and not a voice user, a voice grouped trunk will need to be configured to specify which numbers should be routed out the PRI trunk. A good rule of thumb is to be specific with trunks going to CPE devices and be general when creating call routing rules with trunks going to the PSTN/SIP network. In this example, we have been assigned the number 256-555-1000 by the SIP provider and want to route that number out the PRI trunk. We do this by adding an 'accept' entry for the specific number.

```
(config)#voice grouped-trunk "PRI TO PBX"  
(config-PRI TO PBX)#trunk T02  
(config-PRI TO PBX)#accept 256-555-1000 cost 0  
(config-PRI TO PBX)#exit
```

Step 4:

Once everything is configured correctly, you will want to save your changes.

```
(config)#exit  
#copy running-config startup-config
```

Example Configuration

```
interface t1 0/2  
  description PRI to PBX  
  tdm-group 1 timeslots 1-24 speed 64  
  no shutdown  
!  
interface pri 1  
  description PRI to PBX  
  connect t1 0/2 tdm 1  
  isdn name-delivery setup  
  no shutdown  
!  
isdn-group 1  
  connect pri 1  
!  
voice codec-list Trunk  
  codec g729  
  codec g711ulaw  
!  
voice trunk T02 type isdn  
  description "PRI to PBX"  
  no reject-external  
  connect isdn-group 1  
!  
voice grouped-trunk "PRI TO PBX"  
  no description  
  trunk T02  
  accept 256-555-1000 cost 0
```

If you experience any problems using your ADTRAN product, please contact [ADTRAN Technical Support](#).

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