



Configuration Sample

Calling phone-to-phone with Analog Tenors

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I. Introduction.

This document will provide customers using, Quintum Tenors, the necessary information (as an example) so that they will be able to configure two Tenors to call between each other using either a phone or PBX connected directly to the Tenors.

Other options and features will be presented as well, such as toll-bypass or hop-off calls and autoswitch.

In the following sections there will be sample applications along with sample configurations for each Tenor.

This document is intended to be used by those technicians that have experience with Quintum and only pertains to the Tenor analog product line (excluding the A200).

The information provided here is only an example and your application requirements may be different, but you should be able to use this as a guideline. Additionally, while some of the configurations provide information on the line configurations (such as signaling and type, etc.) the main focus is to provide the necessary information to route calls between 2 Tenors. The connection after that may vary.

II. Required Information.

Before setting up this application, or any other, there is always information that you should gather so that you can be prepared and understand how you will need to configure your Tenor, and your Cisco. For analog and digital Tenors, Quintum has a site survey form that you may find useful (check our web site for these forms) otherwise, the following information should be identified at a minimum;

- IP addresses to be used for both Tenors.
- Audio codec/compression to be used.
- Dial plan information (country area code, long distance prefix, international prefix, etc.).
- Dial/number patterns to be sent over IP.
- Dial/number patterns to be dialed out to PSTN.
- Disconnect supervision and answer supervision requirements.

III. Phone-to-Phone Calls (basic setup).

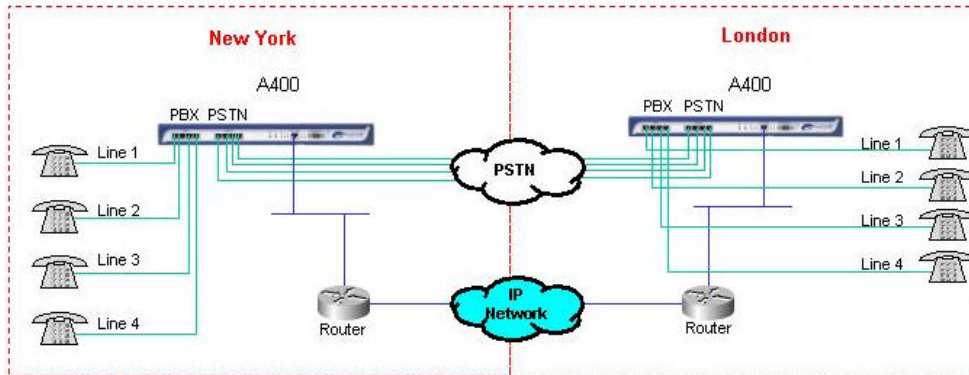


Figure 1

Application Description;

As shown in figure 1 above, this application will have 2 locations for testing, one in New York and the other in London. Both locations will have a Tenor analog A400 that is connected to 4 phone lines from the phone company (PSTN) and 4 phones. Each phone line and phone will have its own phone number. The goal is to be able to call from each phone to the other by dialing the standard public numbers.

No toll-bypass or hop-off is to be used, nor will autoswitch be used. No station-to-station (within same Tenor) is used and no abbreviate dialing is used. For this simple application you can start with one phone and no PSTN connections as well.

Dialing between locations will be done as if calling through public phone network utilizing international dialing prefix in this case as the locations are not in the same country. This will allow the Tenor to utilize the Multi-Path¹ feature.

The New York Tenor will be assigned as the Border Element or master GK for this network, although, static routes can be utilized instead.

Site Information

Below lists all of the information that is necessary to configure this application.

Site	New York	London
IP Address	208.226.141.100	200.152.32.100
Country	USA	UK
Country code	1	44
City/area code	212	20
Long Distance Prefix	1	0
International Prefix	011	00
Minimum number of digits to dial.	7	7
Maximum number of digits to dial.	20	20
Phone/Line 1 number	5551001	44442001
Phone/Line 2 number	5551002	44442002
Phone/Line 3 number	5551003	44442003
Phone/Line 4 number	5551004	44442004

¹ If a call fails to initially connect, it will automatically be re-route, as dialed, to the PSTN.



Configuration

All configuration will be done via Telnet interface. The below will show you the settings required when the Tenor is at a factory default.

Prompt Level	Command	Setting		Comments
		New York	London	
config unit 1#	ip	208.226.141.100	200.152.32.100	
	online	1	1	Places the Tenor online.
config sys#	country	0	2	
	countrycode	1	44	
	areacode	212	20	
	ldpref	1	0	
	intlpref 1	011	00	
	mindn	7	8	When US is selected as the country, the Tenor sets up the dial plan for you internally so there is no need to specify the min and max digits.
	maxdn	7	22	
config pstntg 1#	cassignal	6	1	Type of cassig may be different for your area.
	disablech	1 a	1 a	Disables all channels in trunk group.
	enablech	1	1	Enables only channel 1.
	modem	0	0	
	supervision		1	Sets up tone based disconnect for UK.
config pstntg 2#	name	PSTN02	PSTN02	
	cassignal	6	1	
	disablech	1 a	1 a	
	enablech	2	2	Enables channel 2 only.
	modem	0	0	
	supervision		1	
config pstntg 3#	name	PSTN03	PSTN03	
	cassignal	6	1	
	disablech	1 a	1 a	
	enablech	3	3	Enables channel 3 only.
	modem	0	0	
	supervision		1	
config pstntg 4#	name	PSTN04	PSTN04	
	cassignal	6	1	
	modem	0	0	
	supervision		1	
config pbxtg 1#	cassig	6	1	
	huntpubldn	5551001	44442001	The first phone's number.
	disablech	1 a	1 a	Disables all channels in trunk group.
	enablech	1	1	Enables only channel 1.
	modem	0	0	
config pbxtg 2#	name	PBX02	PBX02	
	cassig	6	1	
	huntpubldn	5551002	44442002	The second phone's number.
	disablech	1 a	1 a	
	enablech	2	2	Enables only channel 2.
	modem	0	0	
config pbxtg 3#	name	PBX03	PBX03	
	cassig	6	1	
	huntpubldn	5551003	44442003	The third phone's number.
	disablech	1 a	1 a	
	enablech	3	3	Enables only channel 3.
	modem	0	0	
config pbxtg 4#	name	PBX04	PBX04	
	cassig	6	1	
	huntpubldn	5551004	44442004	The fourth phone's number.



	modem	0	0	
config gksys#	border 0	208.226.141.100	208.226.141.100	Sets the primary border element to the NY Tenor.
config#	submit			Submits changes.

With this configuration, you should now be able to call from a phone in NY to a phone in London by dialing the full number as you would from a public phone (011442044442001) and vice versa (0012125551001).

If the call fails to connect over IP, it will automatically be routed out the local PSTN connection (if one is available).

It is not necessary to have a PSTN connected for this test or application. If no PSTN is connected, we recommend that in the config pbxtg's, you set the multipath option to 0, so that the Tenor will not try and re-route to the PSTN ports.

Explanation

When both units are pointed to the same Border Element (BE), then the phone numbers and IP addresses will be known to both units through the BE registration to the internal Gatekeepers (GK). When a number is dialed, the Tenor will first put the number into the E.164 format (country code + city/area code + local number). It figures this out by analyzing the dialed number as follows;

- If it begins with the configured international prefix, then it strips the prefix off and knows that it should already be in the E.164 format.
- If the number begins with the configured long distance prefix, then the Tenor strips the prefix off and adds the configured country code (config sys# countrycode) to the number to create an E.164 format. For example if the dialed number is 02066661234, 0 is deleted as the long distance prefix and 44 is added to the number.
- If the number does not begin with either prefix, then the number is determined to be a local format number and both the country code and area code are added to the number to create the E.164 format.

Once the number is in the E.164 format a request is sent to the internal GK for a route for this number. The GK will look up in its table that it received from the BE and if it finds a match for the dialed number, will provide the IP address to route the call. If no match is found, the GK states this, the number is returned to the originally dialed format and the call is routed to the PSTN.

IV. Additional options & features for phone-to-phone calling.

A. Toll Bypass/Hop-off dialing;

Description:

This is a feature that allows you to call over IP from one location to the other and then “hop-off” to the PSTN connection at the other site thereby saving international rates. For example, if you wanted to call another US number from London, but avoid international rates, you call over IP to the Tenor in NY and “hop-off” to the NY PSTN connection so it will just be a long distance call.

Configuration:

Using the configuration from Section III, you add the following;

Prompt Level	Command	Setting		Comments
		New York	London	



config pstntg 1#	lampat	1 1212 2 1	1 4420	The first pattern will allow for local calls as with this pattern, you must delete the country code and city/area code off of the number. The 2 nd (US only) allows for all long distance calls to pass through.
	lamrep	2 1		This will add the 1 back on to the number in pattern 2 so it is the long distance prefix then the number. Refer to the CLI guide for more information on this.
Repeat the above for all 4 PSTN trunk groups and submit changes.				

With the above-added changes, you should be able to call from London, over IP to any phone in the U.S. additionally, you should be able to call from NY to any phone in the city code of 20 (London).

Explanation:

The routing is the same as in section III, but the termination will be slightly different. In order to understand the configuration of the lampat and lamrep, you must first understand how this works.

When a call comes in to a termination Tenor and a match is found to the lampat, the Tenor will delete the matching digits off of the incoming number. So, from the U.S., if you dial 011442066661234, it is first converted to E.164 (442066661234) and sent over IP. When it gets to the London Tenor, a match to the lampat is found and the matching digits (4420) are deleted off of the number so you are left with 66661234.

The lamrep is the digits that you add back on to the number, if necessary, before sending to the PSTN line. In the above example, there is no need to add any digits to the number as it is a local call. However, if London were to call to a NJ phone, they might dial 0017324609000, E.164 format is 17324609000. This gets sent over IP to the NY Tenor. When the NY Tenor receives this call, it finds a match and deletes the matching digit of 1 (being the country code, then the lamrep, tells the Tenor to add 1 on (being the long distance prefix) and the call is sent to the PSTN.

B. Abbreviated/Extension dialing:

Description:

This is a feature that allows you to dial an abbreviated number from phone to phone instead of the full number. Using the base configuration from section III, we will add the feature of 4 digit dialing between sites. With this feature, you will also gain the ability to call from phone-to-phone within the same Tenor, however, when you want to call a public number, to the PSTN, you will need to dial a 9 prefix (like a PBX). The reason for this is that the Tenor needs to understand the difference between the abbreviated or private dialing and the public dialing. The 9 will tell the Tenor that the digits following will be a public type of number.

The last 4 digits of the phone number will be used to dial between phones.

Configuration:

Using the configuration from Section III, you add the following:

Prompt Level	Command	Setting		Comments
		New York	London	
config sys#	intercom	1	1	Enabled intercom dialing
	intercompref			Set to null so it deletes the prefix.
	centrepref			Set to null so it deletes the prefix.
	pstnroute			Set to null so it deletes the prefix.
	iproutepref			Set to null so it deletes the prefix.
	multipathpre	9	9	Sets the multi-path prefix to 9
	private	1	1	Enabled private dialing.



	prvlen	4	4	Sets the private digit length to 4 digits.
config pbxtg 1#	huntprv	1001	2001	Sets the private 4 digit numbers.
config pbxtg 2#	huntprv	1002	2002	
config pbxtg 3#	huntprv	1003	2003	
config pbxtg 4#	huntprv	1004	2004	
Submit changes.				

You should now be able to call from phone-to-phone (both on the same Tenor and to the other Tenor) by dialing the 4-digit number. You can also dial public numbers (both locally or pass-through and hop-off as in alternate config B above) by dialing 9 then the normal number (9001212xxxxxxx).

Explanation:

In this mode, the Tenor has to first know if the number dialed is a private/4 digit number or a public number. This is done using the intercom feature and the multipath prefix. If the dial number does not begin with the multi-path prefix, then it is considered to be a private number and only the prvlen (configured as 4 for this example) number of digits will be accepted. The Tenor will then look for a match on the digits, as dialed, first internally to another PBX trunk group and if no match is found, then over IP. NOTE: if the call fails to connect, it cannot be routed to the PSTN as the public PSTN would not know how to route the 4-digit number.

If the number dialed starts with the multi-path prefix (9 in this case), the Tenor will strip the 9 off of the number, treat it as a public number and go through the E.164 format described in section III.

V. Summary

The above provides configurations for this simple type of setup. For more information on the individual commands, please refer to the CLI guide or other documents on this web site.