

# JDSU HST-3000 SIP Trunk Testing Guide



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## Scope

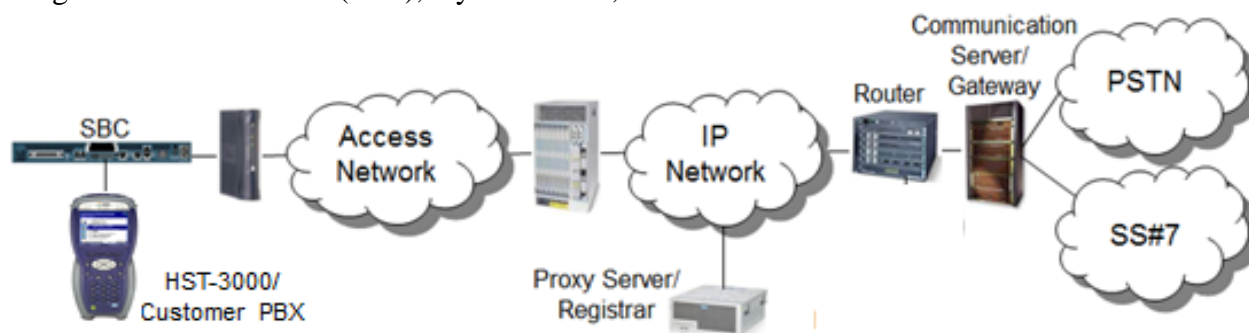
This document covers SIP Trunk testing procedures used for Business Services customer activation, fault isolation, and troubleshooting using the JDSU HST-3000 portable business services tester.

## Revision History

<i>Revision</i>	<i>Description</i>	<i>Name</i>
1.0	Initial Draft	Dave Baker, JDSU
1.1	Added network diagram	Dave Baker, JDSU

## 1. Overview

This document covers SIP Trunk testing procedures used for Business Services customer activation, fault isolation and troubleshooting. At customer activation, this test equipment is used to emulate the customer's PBX and validate the performance of a SIP trunk. In this document, the device that the HST-3000 is connected to is referred to as the Session Border Controller (SBC). It may also be an Integrated Access Device (IAD), layer 2 switch, or other network element.



## 1.1 Hardware Description

The HST-3000 is a portable test tool for Ethernet testing. The product supports a variety of subscriber interface modules (SIMs) to support Ethernet, T1/T3, Copper/DSL and other access technologies. A SIM is not required for this test. Menu selections are made from the HST-3000 front panel by using the keypad to select the option number or by using the arrow keys to scroll to the desired selection and pressing the **OK** key.

*HST-3000 Front Panel:*

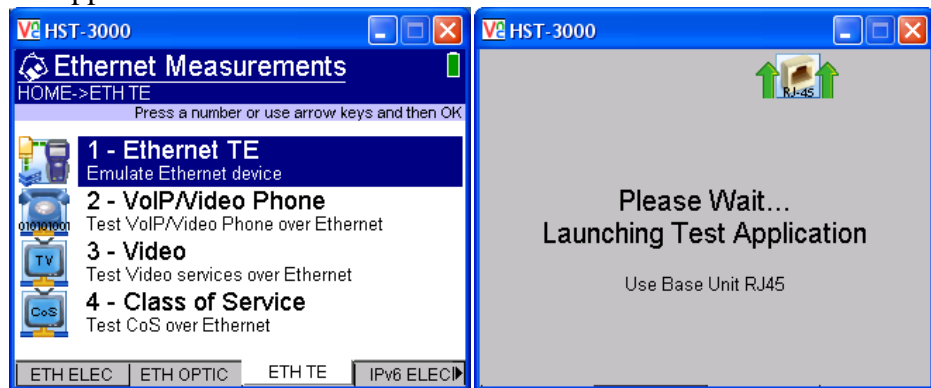


## 2. SIP Trunk Test Procedures

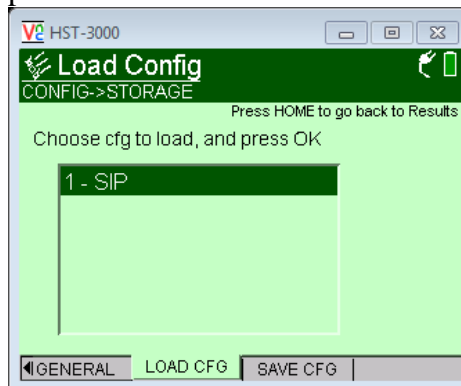
The following procedures describe how to test a SIP trunk by placing and receiving calls using the HST-3000 to emulate the customer PBX. Instructions are included for both registering and non-registering trunks.

### 2.1 Configure Ethernet TE and VoIP/Video Phone

Step	Action	Details
1.	Power On	Press the green Power Key to turn on the HST-3000.
2.	Launch Test App	Press the <b>ETH TE</b> Soft key. Press the <b>OK</b> key to launch the <b>Ethernet TE</b> test application.



3.	Load Config	Press the <b>Configure</b> Navigation key to configure Ethernet TE test setting. If a configuration file has been previously stored, press the <b>Left Arrow</b> key twice to select the <b>LOAD</b> select the desired Configuration file and press OK.
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4. Configure Ethernet Press the **LAN** soft key and configure your test as follows. Leave all other values at factory default settings, unless specified in the Work Order.

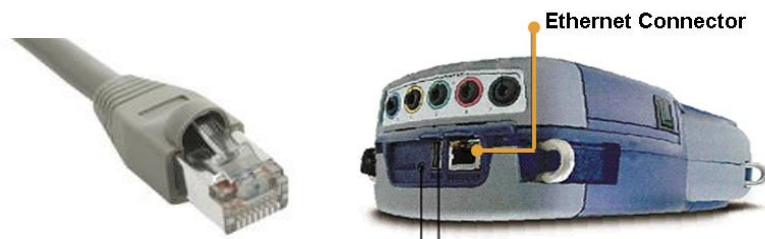
Menu	Option	Value	Comment
LAN	IP Mode	See Work Order	DHCP or Static
	IP Address	See Work Order	Enter Source IP Address for the PBX
	Net Mask	See Work Order	Enter Subnet Mask for the PBX
	Gateway	See Work Order	Enter LAN IP Address for the SBC
	Which MAC	Factory Default	
	Media Type	See Work Order	Set to same value as SBC LAN port. Select "Auto-select" if SBC LAN Port is set to "Autonegotiate".
	VLAN, VLAN ID, VLAN Priority	See Work Order	

5. Configure VoIP Press the **Configure** Navigation key again to launch the VoIP test application. Press the **General** and **Proxy** soft keys and configure settings as follows. Leave other values at default, unless specified in Work Order:

Menu	Option	Value	Comment
General	VOIP Mode	Terminate	
	CC Standard	SIP	
	Alias	See Work Order	For Registering Trunks enter Phone Number for the PBX. For Non-Registering Trunks enter as follows: Phone#@SBC LAN IP Address; user=phone i.e. "8608635180@169.254.20.1;user=phone" Notes: <ul style="list-style-type: none"> <li>Use third softkey to toggle between "Keypad:123" for numerical entry (including ".") and "Keypad:abc" for text entry (including "@", ",", and "=").</li> <li>Press "1" seven times to enter "@"</li> <li>Press "*" once to enter "."</li> <li>Press "*" four times enter ","</li> <li>Press "#" eleven times to enter "="</li> <li>Alternately, a standard USB Keypad may be connected to the HST-3000 USB port.</li> </ul>
	Outbound Alias	See Comment	For Registering Trunks select "Dial by Phone Number". For Non-Registering Trunks select "Dial by Name/URI/Email"
	SIP Vendor	Standard SIP	
	100 Rel Usage	Disabled	
	Proxy	Proxy Mode	See Comment
Address Type		IP Address	
Proxy IP		See Work Order	SBC LAN IP Address
Proxy Port		See Work Order	Enter 5060 if not specified
Call Control Port		5060	
Proxy Username		See Work Order	
Proxy Password		See Work Order	

## 2.2 Verify Local Connection to Session Border Controller (SBC)

<i>Step</i>	<i>Action</i>	<i>Details</i>
1.	Connect	Connect to the Ethernet port on Session Border Controller (SBC) using a straight through Ethernet cable and the RJ-45 connector labeled <b>ETHERNET</b> on the top of the mainframe.



2. View Results Press the **Home** key to display VoIP Phone Results.

3. Check LED A **Green** Sync LED indicates the HST-3000 has connected to the SBC, and the Ethernet link is active.



If the **Sync** LED is not green, verify the following:

- The HST-3000 is configured correctly, as outlined above.
- The SBC LAN port is enabled and configured for the correct speed and duplex (auto negotiate or fixed speed/duplex)
- Cables are good quality and properly connected.

If the **Sync** LED is still not green, the HST-3000 cannot establish an Ethernet link with the SBC. Contact VoIP Technical Support.

4. Test For Registering Trunks, proceed to Section 2.3. For Non-Registering Trunks, proceed to Section 2.4.

## 2.3 Verify Registration with the Proxy Server

<i>Step</i>	<i>Action</i>	<i>Details</i>
1.	Check Reg. status	After establishing a datalink with the SBC, the HST-3000 sends a REGISTER message to the proxy server. Registration status is displayed in the <b>VoIP Phone</b> results screen. “Proxy Registration Successful” indicates that the HST-3000 is registered with the Proxy Server.

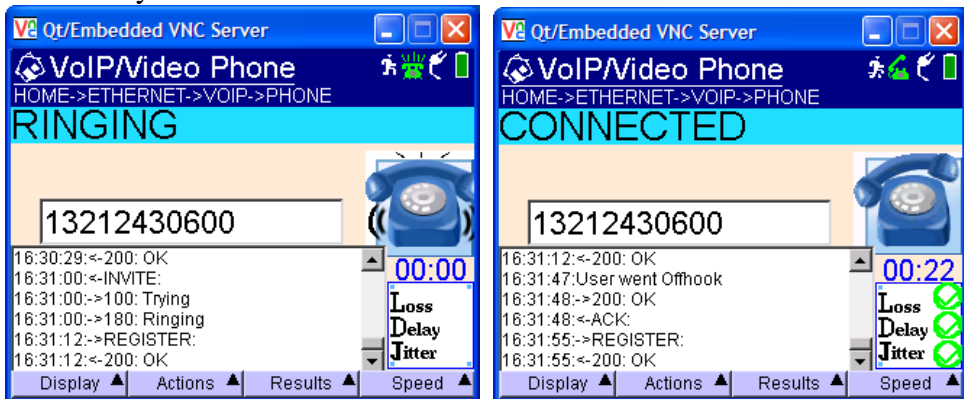


- |    |              |  |
|----|--------------|--|
| 2. | Troubleshoot | <p>If “<b>Proxy Registration Successful</b>” is not displayed in the Message Bar or Messages Log, verify the following:</p> <ul style="list-style-type: none"> <li>• The HST-3000 setup is correct, as outlined above.</li> <li>• IP Addresses, User Name, and Password are correct on the work order.</li> <li>• You can Ping the SBC.</li> </ul> |
|----|--------------|--|

If “**Proxy Registration Successful**” is still not displayed, the test has failed. Contact VoIP Technical Support.

## 2.4 Inbound Call Testing

Step	Action	Details
1.	Dial	Using your cell phone, dial the Telephone Number ( BTN) of the HST 3000/PBX.
2.	Answer	When an inbound call reaches the HST-3000, allow the call to ring at least 2 times. Confirm the Ring back tone is heard on your cell phone, and press the <b>OK</b> key to answer to call.




3.	Converse	Confirm that Voice is heard and Voice Quality is good on the HST-3000 and on the Cell Phone.
4.	Disconnect Call	Hang up the call from your cell phone. Verify that the call state on the HST-3000 changes to <b>IDLE</b>





## 2.5 Outbound Call Testing

Step	Action	Details
1.	Dial	<p>Press 1 to Enter Destination Alias. Using the HST-3000 keypad or USB keypad, enter the Destination Alias for your cell phone and press <b>OK</b>. For Registering trunks, enter the phone number. For non-registering trunks, enter a URI as follows: Phone Number@SBC LAN IP Address. i.e. “3215551234@169.254.20.1”.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• Use third softkey to toggle between “Keypad:123” for numerical entry (including “.”) and “Keypad:abc” for text entry (including “@”).</li> <li>• Press “1” seven times to enter “@”</li> <li>• Press “*” once to enter “.”</li> </ul>
2.	OK	Press <b>OK</b> again to go off hook and place the call. The HST-3000 will send an INVITE message to set up the call. Call status is displayed in the VoIP Phone results screen.
3.	Answer	Answer the incoming call on your cell phone. “CONNECTED” indicates that the call setup was successful.
		
4.	Converse	Confirm that Voice is heard and Voice Quality is good on the HST-3000 and on the Cell Phone.
5.	Troubleshoot	If “CONNECTED” is not displayed in step 3 or voice is not heard in step 4, verify that the HST-3000 setup is correct and that your cell phone is working properly and repeat step 1. If “CONNECTED” is still not displayed, the test has failed. Contact VoIP Technical Support.

## 6. View Results

After the Call is connected for at least 1 minute, use the **Right Arrow** key or the **Display** soft key to review the **Audio Quality of Service** (Delay, Jitter, Loss) and **Quality Scores** (MOS). Ensure scores are good, as indicated by a green checkmark. If RTCP is disabled in the network, Remote Scores will be unavailable.

Audio Quality of Service				
HOME->ETHERNET->VOIP->PHONE				
Local	Cur	Min	Max	Score
Delay	1 ms	1 ms	12 ms	✓
Jitter	2 ms	1 ms	11 ms	✓
Loss	77 packets		(0%)	✓
Overall				✓
Remote	Cur	Min	Max	Score
Delay	1 ms	1 ms	12 ms	✓
Jitter	2 ms	1 ms	4 ms	✓
Loss	132 packets			✓
Overall				✓

Quality Scores	
HOME->ETHERNET->VOIP->PHONE	
Call Score Measurement	
MOS	R Factor
Actual	LQ: 93 ✓
4.20	CQ: 93 ✓
Perfect	
4.20	
✓	

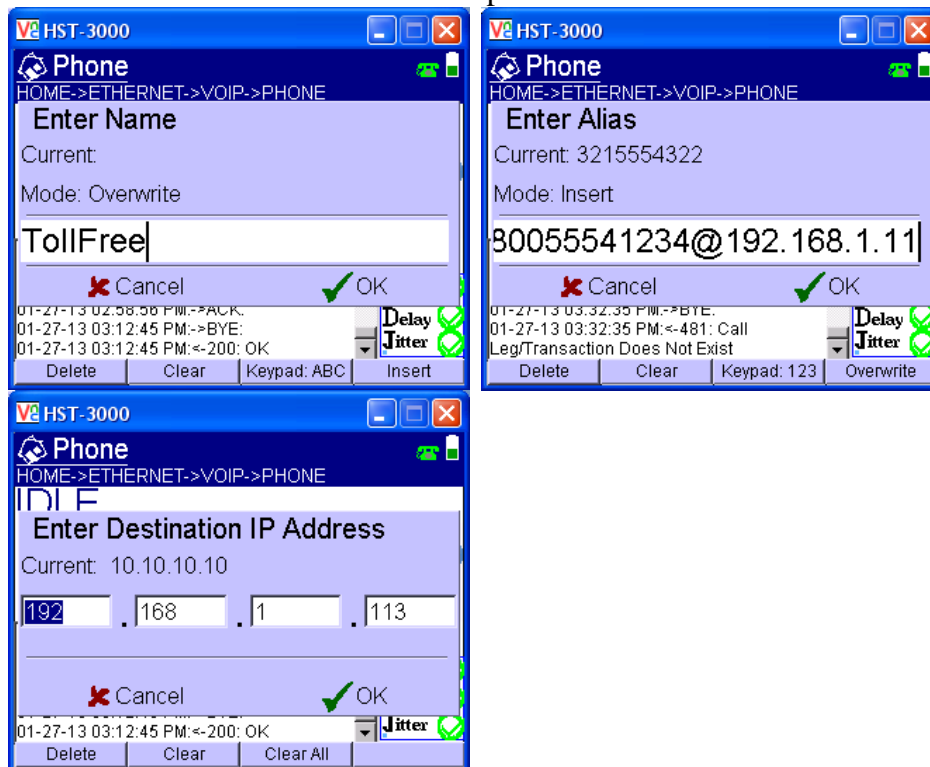
If the Delay, Jitter, Loss, or Overall **Score** indicate that any tests failed, contact VoIP Technical Support.

## 7. Disconnect Call

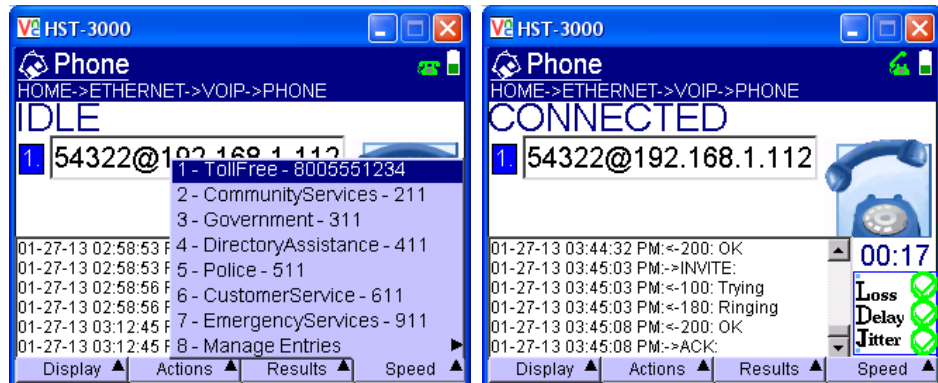
Press the **Left Arrow** key or the **Display** soft key to select the **Phone** display. Press the **OK** key to disconnect the call.

## 2.6 Call Plan Testing

Step	Action	Details
1.	Add Entries	If a speed dial list hasn't been added yet, press the <b>Speed</b> soft key, select <b>Manage Entries</b> , and select <b>Add</b> . Enter a name, alias, and IP Address at the prompts. For Registering trunks, enter the phone number at the Alias prompt. For non-registering trunks, enter a URI at the Alias prompt, as follows: Phone Number@SBC LAN IP Address. i.e. "8005551234@192.168.1.113". At the Destination IP Address prompt, enter the IP address of the SBC LAN port.



2. Repeat Repeat step 1 for the desired numbers in your call plan. Numbers may include the following:
- Toll Free number
  - Local off-network number
  - Local on-network number
  - Long Distance number
  - International number
  - Blocked Call
  - 211 (community services)
  - 311 ( municipal government services, non-emergency )
  - 411 (directory assistance)
  - 511 (traffic information or police non-emergency services )
  - 611 (customer service)
  - 711 ( TDD relay for the deaf)
  - 811 (underground public utility location)
  - 911 (emergency services)
3. Dial Using the HST-3000 **Speed** soft key, select the first entry in the dial plan and press **OK**. Press **OK** again to dial. The HST-3000 sends an INVITE message to set up the call. Call status is displayed in the VoIP Phone results screen. Verify that you hear a ring back tone before the call is connected.



4. Converse Talk to the called party and verify that voice quality is good for a period of at least 15 seconds.
5. Disconnect Call Press the **OK** key to disconnect the call
6. Repeat Repeat steps 3 through 5 for all numbers in the Speed dial list.

## 2.7 Saving Test Results

Step	Action	Details
1.	Save Results	Press the <b>Results</b> soft key, select <b>Save Results</b> , and enter a filename to save the test results. Press <b>OK</b> after “File Saved!” is displayed.
2.	Connect	Connect the USB Flash Drive to the HST-3000’s USB port on the top of the mainframe.

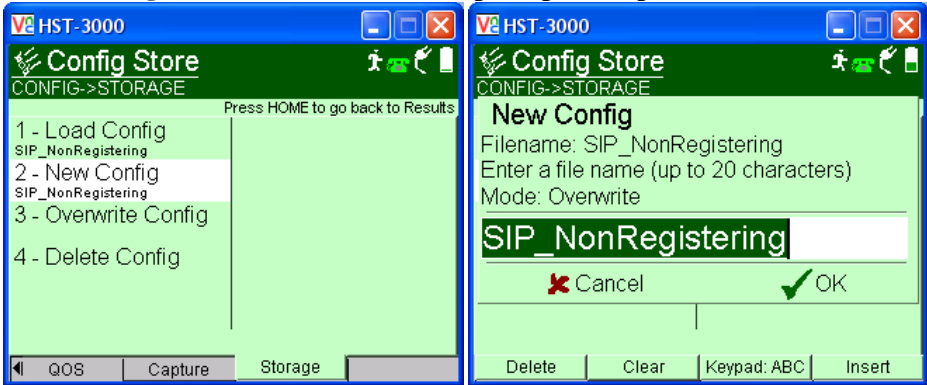


3.	System Tools	Press the <b>System</b> Navigation key, and press the <b>TOOLS</b> soft key. Press the <b>OK</b> key to launch the <b>File Manager</b> .
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4.	Copy File(s)	Using the <b>OK</b> key, <b>Up Arrow</b> key, and <b>Down Arrow</b> key, navigate to the desired file in the /results/Ethernet/VoIP folder. Press the <b>Action</b> Soft key and select “Copy to USB”.
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## 2.8 Saving Configuration File

<i>Step</i>	<i>Action</i>	<i>Details</i>
1.	Save Config	<p>If this configuration file has not been previously stored, press the <b>Home</b> Navigation key, then press the <b>Configure</b> Navigation key. Press the Right Arrow key several times to display the <b>Config Store</b> menu, select <b>New Config</b>, enter a Filename at the prompt, and press <b>OK</b>.</p> 
2.	Shutdown	Press the green power button to turn the unit off.
3.	Disconnect	Disconnect the USB Flash Drive from the HST-3000's USB port on the top of the mainframe.