

Testing Ethernet Voice over IP (VOIP) SIP Trunks

- This quick card describes how to configure and run an Ethernet VOIP Test to validate the provisioning and performance of a Session Border Controller (SBC) and SIP trunk at the network border. The following Information is needed to complete this test:
 - ✓ Physical Interface (RJ-45 Copper, 1000BASE-SX Multimode, 1000BASE-LX Single mode, etc.)
 - ✓ Speed and Auto Negotiation settings of the SBC LAN port
 - ✓ VLAN ID (if a VLAN is being used)
 - ✓ IP Address for the SBC LAN port
 - ✓ IP Address, Subnet mask, and default gateway for the T-BERD/MTS or PBX
 - ✓ Is registration required, or is this a non-registering trunk?
 - ✓ Username and Password (required for registering trunks only)
 - ✓ Customer's Billing Telephone Number for the SIP trunk
 - ✓ Destination Telephone Number(s) for outbound call testing
- T-BERD/MTS 5800 equipped with the following:
 - Transport software release V31.2.1 or greater
 - Test options:
 - C5VOIP: Voice over IP option
 - C5BT: Bluetooth (optional, for Bluetooth headset)
 - C5LSCAPTURE or C510GCAPTURE (recommended for packet capture and analysis)
- Headset (Plantronics M114/M210c, or Benertech A310QD)
- CAT5E or fiber optic cables to match the line under test
- For optical interfaces:
 - Fiber inspection microscope (P5000i or FiberChek Probe)
 - Fiber optic cleaning supplies

CONNECT HEADSET AND CONFIGURE AUDIO SETTINGS

- Press the Power button to turn on the T-BERD/MTS.
- Connect the headset to the headset jack on the side of the T-BERD/MTS.
- 3. Press the **System** icon **System** in the top left corner of the screen.
- Press the Audio icon . Set Speaker Volume near the maximum setting and set Microphone Volume to the center setting. If desired, you can adjust these settings during the test. The speaker icon on the top bar of the T-BERD provides a shortcut to this screen.







Figure 3: Audio Settings



Figure 1: Equipment Requirements

T-BERD/MTS 5800 Portable Network Tester



QUICK CARD

LAUNCH TEST

- 1. Press the **Test** icon ^[] at the top of the screen to display the Launch Screen.
- Using the **Select Test** menu, Quick Launch 2. menu, or Job Manager, launch the Ethernet, VoIP, Terminate test for the desired physical interface/line rate and port; for example:
 - Ethernet ► 1GigE Optical ► VolP ► P1 Terminate
 - Ethernet ► 10/100/1000 ► VoIP ► P2 Terminate
 - Note: If tests have been launched on both Port 1 and Port 2, you must remove the test on Port 2 before launching the VOIP test. Tap the **X** icon next to the Port 2 tab in the Select Test bar or tap 😵 Remove Test 🕨 in the Select Test menu to remove the test.
- Tap to open the Tools Panel and 3. Reset Test to select 📀 Defaults

Press ^{*}

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🥶 System 🔛 Test 😽 Fiber Optics V2 🗻 🌒 🔒 00/1000 Eth VoIP Term 🗙 DS1/DS3 **DS1 ISDN PRI Term** DS1 E1/E3/E4 SONET C 10/100/1000 Eth VoIP Term SDH Ethernet C **1GigE Eth VoIP Term** Fibre Channe C **10GigE LAN VoIP Term** CPRI eCPRI 10/100/1000 12 5

Figure 4: Launch Screen



Figure 5: Tools Panel

CONNECT TO LINE UNDER TEST

to continue.

- For copper testing with the SmartClass 4800 or T-BERD/MTS 5800v2, connect the Port 1 10/100/1000 RJ-45 jack to the Ethernet port under test using CAT 5E or better cable.
- For copper testing with the T-BERD/MTS 5800-100G, connect the Port 2 10/100/1000 RJ-45 jack to the Ethernet port under test using CAT 5E or better cable.
- For optical testing, insert an SFP or SFP+ into the Port 1 slot on the top of the T-BERD/MTS.
 - Ensure the fiber and connectors are clean using a Fiber Inspection microscope. 1.
 - 2. Connect the SFP or SFP+ to the Ethernet port under test.
 - Use Multimode jumper cables for 850 nm 1000BASE-SX or 10GBASE-SR.
 - Use Single mode jumper cables for 1310 nm 1000BASE-LX or 10GBASE-LR.
 - Laser Off Select the Laser tab in the Main Action Panel and press to turn the Laser on. 3.



Figure 6: T-BERD/MTS 5800v2



Figure 7: T-BERD/MTS 5800-100G



CONFIGURE TEST

- 1. Press the **Setup** soft key 📄 on the top right side of the screen.
- 2. Select the indicated folders and configure your test as follows. Leave all other values at default, unless specified in the work order.

Folder	Option	Value(s)
Interface,	Auto Negotiation	Set to same value as the SBC LAN port under test. Enter Speed if Auto
Physical Layer	Auto Negotiation	Negotiation is off; i.e., 100 Mbps.
	Encapsulation	None or VLAN. Enter VLAN ID if VLAN is being used.
	Source IP Type	Static or DHCP.
Ethernet/IP	Source IP	Enter the static Source IP Address for the T-BERD/MTS/PBX.
	Default Gateway	Enter the IP Address for the SBC LAN port.
	Subnet Mask	Enter Subnet Mask for the T-BERD/MTS/PBX.



Figure 8: Setup, Interface

Figure 9: Setup, Ethernet/IP

Folder	Option	Value(s)
		For Registering Trunks, enter Billing Telephone Number (BTN) for the PBX.
	Source Alias	For Non-Registering Trunks, enter BTN@SBC LAN IP Address; user=phone.
VoIP, General		i.e."3215554321@192.168.1.1;user=phone"
	Outbound Alias	For Registering Trunks, select "Phone Number".
	(Dial by)	For Non-Registering Trunks, select "Name/URI/Email"
	Doct Dhone Number/	For Registering trunks, enter your 10-digit cell phone number.
	Name /URI/ Email	For non-registering trunks, enter Cell Phone Number@SBC LAN IP Address.
		i.e. "3215551234@192.168.1.1".
	100 Rel Usage	Disabled

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Figure 10: Non-registering Trunk Setup, VOIP/General

Figure 11: Registering Trunk Setup, VOIP/General

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QUICK CARD

CONFIGURE TEST (continued)

Folder	Option	Value(s)
Drovy Modo		For Registering Trunks, select "Static"
	PTOXY WIDDE	For Non-Registering Trunks, select "No Proxy"
VoIP, Proxy IP Proxy Proxy Username		SBC LAN IP Address
		Enter User Name.
	Proxy Password	Enter Password.

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Interface Ethernet/IP PPP VoIP Capture VoIP Filters	General Proxy Call Mana Gatekeeper Audio Codec OoS	Proxy Mode Call Control Port	No Proxy		Results	Interface Ethernet/IP PPP VoIP Capture VoIP Filters	General Proxy Call Mana Gatekeeper Audio Codec OoS	Proxy Mode Address Type Proxy IP Proxy Username Proxy Password	Static IP Add Ping	ress 68.1.1 ime ord	•	Results
								Proxy Port Call Control Port	5060 5060			

Figure 12: Non-registering Trunk Setup, VoIP/Proxy

Figure 13: Registering Trunk Setup, VoIP/Proxy

- 3. If you have configured settings for a Registering Trunk, tap **Ping** to verify connectivity to the SBC.
- 4. Tap the **Results** soft key 📩 to view the Test Results screen.

VERIFY CONNECTIVITY AND REGISTRATION

- 1. Verify the following:
 - ► Summary LED is green
 - ► Network Up LED is green
 - ► Sync Acquired LED is green
 - ► Link Active LED is green
- 2. If you are testing a **Registering Trunk** and have configured VoIP/Proxy settings, the T-BERD/MTS automatically sends a REGISTER message to the Proxy IP. A green phone labeled "Registered" in the LED panel indicates successful registration.



Figure 14: Non-registering Trunk Results

Figure 15: Registering Trunk Results

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VERIFY CONNECTIVITY AND REGISTRATION (continued)

Troubleshooting Tips:

- 1. If the specified LEDs are not green, verify the following:
 - ► The T-BERD/MTS is configured correctly, as outlined above.
 - ► The LAN Port of the SBC is properly configured and enabled.
 - Cables are good quality and properly connected.
- 2. Tap the message icon in the top left screen 3 messages to confirm DHCP IP Address assignment.
- 3. Change the results category and group from **Summary/Status** to **Ethernet/Stats** to view Ethernet Statistics including Local Config Status and error counts.
- Change the results category and group to Transaction Log/Signaling to view registration messages. If the T-BERD/MTS fails to automatically register, tap the Register button in the Main Action Panel at the bottom of the screen.
- 5. If your unit includes options for **Packet Capture**, start a capture session and view signaling messages using WireShark.

INBOUND CALL TESTING

- Using your cell phone, dial the billing telephone number (BTN) for the PBX (or dial the temporary "test" number if the BTN has not been ported).
- In the T-BERD/MTS's Actions Panel, select the Call Controls tab. Allow the call to ring at least 2 times. Confirm the Ring back tone is heard on your cell phone and tap Answer Call on the T-BERD/MTS to answer the call.
- 3. Put on the headset. If the headset includes an on/off switch and volume control, turn it on and adjust the volume to the desired level.
- 4. Confirm that voice is heard, and voice quality is acceptable on both the T-BERD/MTS's headset and the Cell Phone. If static is heard on your cell phone, move the microphone boom farther away from your mouth to avoid overdriving the microphone.
- 5. Hang up the call from your cell phone. Verify that the call status on the T-BERD/MTS changes to **IDLE**.



Figure 16: Results, Incoming call

Test Port 1. Tage	Eth VoIP Ter	m 🗙 🛛 Timing Sour	ce	What's	This?	10	1	-
🗐 10 messages	Auto	Name/URI/Email	: 234@192.164.1.109	G.711 U law 64K	\$ 40	0	٦	Setup
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Figure 17: Results, Connected call

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Level (dBm) -4.8 Freg Dev (ppm) 23.2	Answer	Dial by	Dest. Name/URI/Email	Primary Codec	Jitte	r Buffer	Ċ
Summary	Summary		¢ Status			\$	Restart
Idle Coll Duration 22m:0	55	History	Content				

Figure 18: Results, Disconnected



OUTBOUND CALL TESTING

- 1. In the T-BERDMTS's Actions Panel, tap The T-BERD/MTS will transmit INVITE messages to initiate the call. Call status is displayed in the LED panel.
- 2. Answer the incoming call on your cell phone. If the call is successful, Call Status will change from **Ringback** to **Conversation**.
- Converse and confirm that voice quality is acceptable on the T-BERD/MTS and the Cell Phone. A wide variety of call statistics can be viewed in the results screen, by changing the Results category and group from Summary/Status to other selections including Content/Current Call Scores, Transport/QOS, Ethernet/Stats, and more.
- 4. In the T-BERD/MTS **Main** Actions Panel, tap
- 5. In the T-BERD/MTS **Quick Config** menu, change "Destination Phone Number" to the next number in the call plan.
- 6. In the T-BERD/MTS **Main** Actions Panel, tap
- Converse and confirm that voice quality is acceptable on the T-BERD/MTS and for the called party.
- 8. In the T-BERD/MTS Actions Panel, tap
- 9. Repeat steps 5 through 8 for all numbers in the call plan. Call Plans may include:
 - Toll Free numbers
 - Local off-network numbers
 - Local on-network numbers
 - Long Distance numbers
 - International numbers
 - Blocked Calls
 - n11 numbers such as 411 (directory assistance), 611 (customer service), and 911 (emergency services)



Figure 19: Results, Place Call



Figure 20: Results, Connected call

🔅 System 🔛 Test 🛉	😽 Fiber Optics			Vi 🕕 🔒 2:5	4 PM
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Summary	Content	Cur. Call Score	es	C Rest	tart
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vi (* 1970) Vi (*	Main Capture Hang Up	-	-		

Figure 21: Results, Content/Current Call Scores

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QUICK CARD

CREATE REPORT



3. A report will be saved to the T-BERD/MTS /bert/reports folder.



Figure 22: Create Report