Quick Card

T-BERD/MTS 5800™ Network Tester
Testing VOIP SIP Trunks

This document outlines how to connect the T-BERD/MTS to a Session Border Controller (SBC) and run an Ethernet VOIP Terminate test to validate the provisioning and performance of a SIP trunk.

Equipment Requirements:
- T-BERD/MTS 5800v2 or T-BERD 5800-100G equipped with the following:
  - BERT software release V26.1 or greater
  - Test options:
    - C5VOIP: Voice over IP option
    - C5LSCAPTURE (recommended for packet capture/decode)
- CAT5E or optical jumper cables to match the line under test
- Headset (Plantronics M114 or M210c recommended)
- For optical interfaces:
  - Fiber inspection microscope (VIAVI P5000i or FiberChek Probe)
  - Fiber optic cleaning supplies

The following information is required to complete the 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?
- User Name and Password (required for registering trunks only)
- Customer’s Billing Telephone Number for the SIP trunk
- Destination Telephone Number(s) for outbound call testing

Connect to Line Under Test:
- For copper testing with the 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, and proceed to page 2.
- 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, and proceed to page 2.
- 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.
  - Connect the SFP or SFP+ to the Ethernet port under test.
    - Use CAT 5E or better cable for 10/100/1000BASE-T.
    - 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.
Connect and Configure Headset:

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

Launch and Configure Test:

1. Press the Test icon.
2. Using the Select Test menu, Quick Launch menu, or Job Manager, launch the Ethernet, VoIP, Terminate test for the desired physical interface/line rate and port; for example:
   - Ethernet►1GigE Optical►VoIP►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 one test before launching VoIP. Tap the icon next to the unused Port tab (Port 1 or Port 2) in the Select Test bar or tap in the Select Test menu to remove the test.

3. In the Tools Panel select Reset Test to Defaults
4. Press OK to continue.
6. Press the **Setup** Soft Key, on the top right side of the screen. Select the indicated folders and configure your test as follows. Leave all other values at default, unless specified in the work order.

<table>
<thead>
<tr>
<th>Folder</th>
<th>Option</th>
<th>Value(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface, Physical Layer</td>
<td>Auto Negotiation</td>
<td>Set to same value as Ethernet port under test.</td>
</tr>
<tr>
<td></td>
<td>Speed</td>
<td>If Auto Negotiation = On, set to same value as Ethernet port under test.</td>
</tr>
<tr>
<td>Ethernet/IP</td>
<td>Encapsulation</td>
<td>None or VLAN. Enter VLAN ID if VLAN is being used.</td>
</tr>
<tr>
<td></td>
<td>Source IP Type</td>
<td>Static or DHCP</td>
</tr>
<tr>
<td></td>
<td>Source IP</td>
<td>Enter Source IP Address for the T-BERD/MTS/PBX.</td>
</tr>
<tr>
<td></td>
<td>Default Gateway</td>
<td>Enter LAN IP Address for the SBC.</td>
</tr>
<tr>
<td></td>
<td>Subnet Mask</td>
<td>Enter Subnet Mask for the T-BERD/MTS/PBX.</td>
</tr>
<tr>
<td>VoIP, General</td>
<td>Source Alias</td>
<td>For Registering Trunks, enter Billing Telephone Number (BTN) for the PBX.</td>
</tr>
<tr>
<td></td>
<td>Outbound Alias (Dial by)</td>
<td>For Registering Trunks, select “Phone Number”.</td>
</tr>
<tr>
<td></td>
<td>Dest Phone Number/Name/URI/Email</td>
<td>For Registering trunks, enter your 10-digit cell phone number.</td>
</tr>
<tr>
<td></td>
<td>100 Rel Usage</td>
<td>Disabled</td>
</tr>
<tr>
<td>VoIP, Proxy</td>
<td>Proxy Mode</td>
<td>For Registering Trunks, select “Static”</td>
</tr>
<tr>
<td></td>
<td>Proxy IP</td>
<td>SBC LAN IP Address</td>
</tr>
<tr>
<td></td>
<td>Proxy Username</td>
<td>Enter User Name.</td>
</tr>
<tr>
<td></td>
<td>Proxy Password</td>
<td>Enter Password.</td>
</tr>
</tbody>
</table>

7. Press the **Results** Soft Key to view the **Test Results** screen.

8. For **1GigE** and **10GigE** optical tests, select the **Laser** tab in the **Main** Action Panel, and press . The button will turn yellow and be relabeled .

9. Press the **Restart** soft key to reset results.

10. Verify the following:
    - **Summary** LED is green
    - **Network Up** LED is green
    - **Sync Acquired** LED is green
    - **Link Active** LED is green

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.
Verify Registration with the Proxy Server/Registrar:

If you are testing a Registering Trunk and configured VoIP, Proxy settings on page 3, the T-BERD/MTS automatically sends a REGISTER message to the Proxy Server/Registrar. A Green phone labeled “Registered” in the LED panel indicates successful registration.

Inbound Call Testing:

1. Using your cell phone, dial the billing telephone number (BTN) for the T-BERD/MTS or PBX.
2. Allow the call to ring at least 2 times. Confirm the ringback tone is heard on your cell phone and tap Answer.
3. Put on the headset. If the headset includes an on/off switch and volume control, turn it on and adjust volume to desired level.
4. Confirm that voice is heard, and voice quality is acceptable on the T-BERD/MTS’s headset and on the Cell Phone. If static is heard on your cell phone, move the headset’s 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.
Outbound Call Testing:

1. In the T-BERD/MTS **Main** Action Panel, tap ![Place Call](image1). 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**.

3. Converse and confirm that voice quality is acceptable on the T-BERD/MTS and the Cell Phone.

4. In the T-BERD/MTS **Main** Action Panel, tap ![Hang Up](image2) to end the call.

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** Action Panel, tap ![Connect Call](image3). The T-BERD/MTS will transmit INVITE messages to initiate the call.

7. Converse and confirm that voice quality is acceptable on the T-BERD/MTS and for the called party.

8. In the T-BERD/MTS **Main** Action Panel, tap ![Disconnect Call](image4) to disconnect the call.

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)
Troubleshooting Tips:

- The VoIP test will be greyed out in the Select Test menu if tests have been launched on both Port 1 and Port 2. You must remove one test before launching VoIP. Tap the icon next to the Port 1 tab in the Select Test bar or tap in the Select Test menu to remove the test.
- If you are testing a Registering Trunk and the T-BERD fails to automatically register, tap the Register button in the Main Action Panel at the bottom of the screen.
- 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, Content/Historical Call Stats, Transport/QOS, Transaction Log/Signaling, Ethernet/Stats, and more.
- If your T-BERD is optioned with packet capture options (C5LSCAPTURE or C510GCAPTURE), SIP Signaling messages can be captured and analyzed with WireShark. Tap Start Capture in the capture tab at the bottom of the screen to initiate packet capture.
- Voice quality can vary greatly on different model headsets. If voice quality is poor but MOS Scores are acceptable, try a different headset.