

## ◀||| APPLICATION NOTE |||▶

### V.22bis Modem Emulator Test Function for Sage 960B

This document briefly describes the new V.22bis Modem Emulator test function for the Sage Model 960B IP Telephony Set, and how to run it. The Modem Emulator function supports test access at metallic analog and PCM interfaces. For simplicity, the example setup assumes both ends of the circuit are metallic analog 2-wire.

#### Background

A V.22bis modem is commonly used by point-of-sale terminals such as credit card readers. In these applications, the terminal dials a central server and exchanges data.

As voice gateways are replacing legacy circuit-switches, such terminals frequently encounter mysterious problems and stop working. The goal of this test is to emulate such modem calls and find problems.

A V.22bis modem is a full duplex modem, operating at either 2400 or 1200 bps. As noted above, the calling side is the sales *terminal*, and the answering side is the *server*. So, in our test, there is a V.22bis *terminal* emulator and a V.22bis *server* emulator. The "terminal" side must be the call originator (Director), and the "server" side must be the answering side (Responder).

Note that you can't use just a single "Term" or "Server" function in conducting tests. This is because 960B "Term" and "Server" test functions each transmit a known "BER" (bit-error rate) test pattern after passing the initial handshaking. The receiver at each end synchronizes to the pattern and detects all errored bits.

The test provides the following data:

1. A real-time text status display showing the progression through the stages of the call
2. Total received number of bits
3. Number of bit-errors
4. EVM (error-vector-magnitude) — EVM is a parameter that characterizes how good or bad the modulation quality is.
5. A graphical "constellation" display — If the received signal is good (meaning the communication channel under test did not add much noise or other impairments), the received signals will converge to the constellation points.

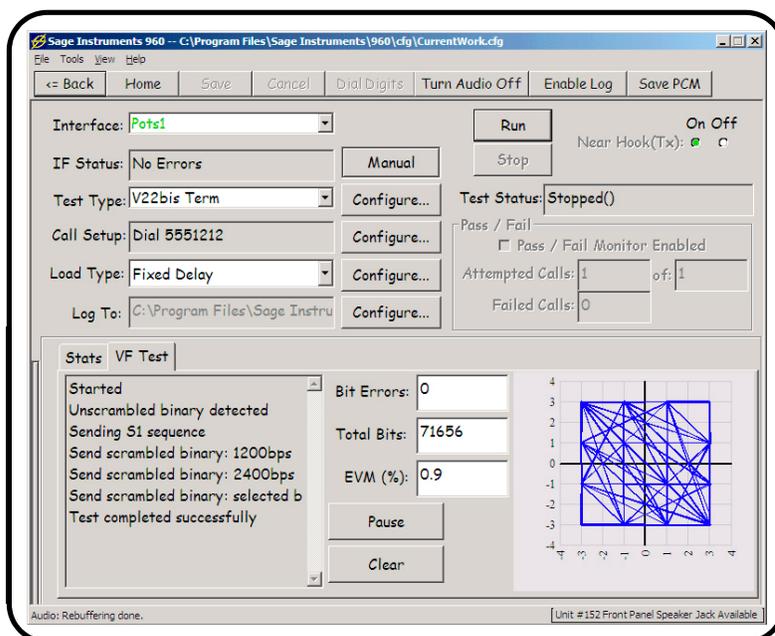


Figure 1 — V.22bis Term Test Results

## Procedure

### Configure the Terminal (Director) Side

1. Configure the 960B analog port for 2-Wire 600 ohms
  - a. Click the "Home" button located at the top of the Sage 96x Windows GUI (graphical user interface) screen
  - b. Double-click on the desired test access interface, then click on the "Configure" button located at the left of the display.
  - c. In the resulting display, locate the "Mode:" window, then click on the corresponding drop down arrow, and select "2-Wire 600 Ohm" as illustrated in *Figure 2*, at right.

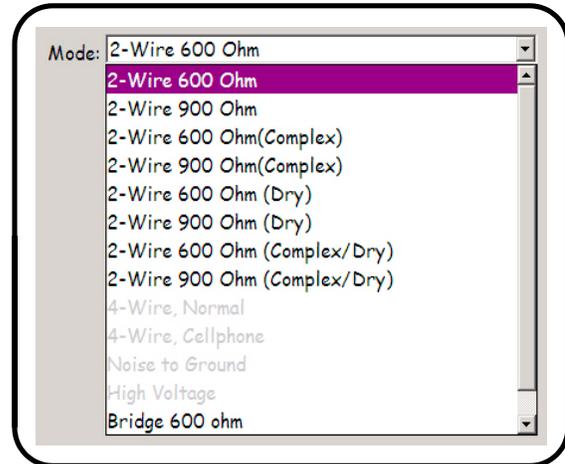


Figure 2 – Select 2-Wire 600 ohm

2. Click the "Back" button located at the upper left of the display.
3. In the resulting "Span View" window, double-click on the channel 1 line.
4. In the resulting screen, locate the "Test Type" window. Click on its associated drop-down arrow and select "V22bis Term", as shown in *Figure 3*, at right.
5. Click the Save button at the upper left of the screen.

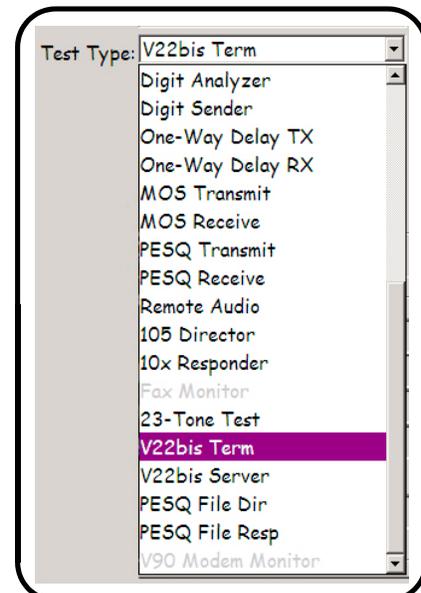


Figure 3 — Select V22bis Term

6. Locate the Configure button associated with the "Test Type" window and click it.
7. You will now see a "Configure V22bis Emulator" dialog box, as shown in *Figure 4*, at right. Here, you can change the
  - a. Transmit signal level
  - b. Test signal duration
  - c. Bit rate to 1200 or 2400 bits-per-second

**Note:** Insure that your bit rate setting for the Term and Server ends match (i.e. either 1200 or 2400)
8. Once you have made any desired changes, click the OK button to accept them.

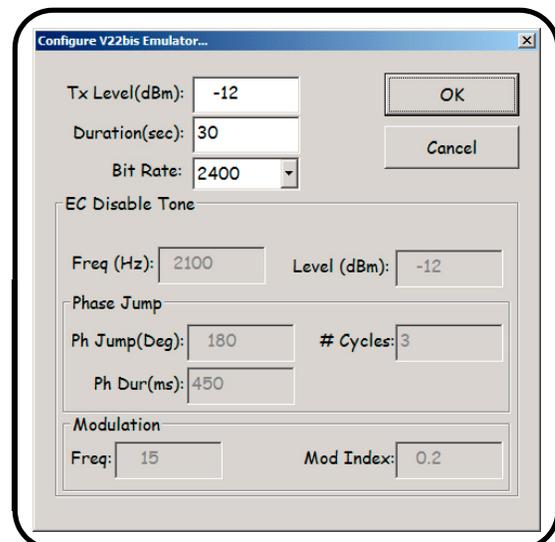
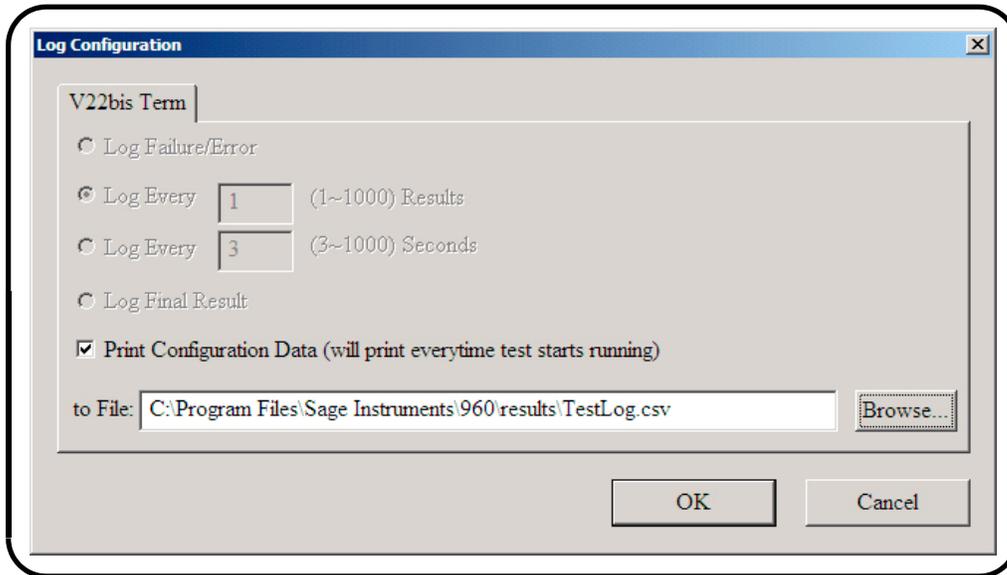


Figure 4 — Terminal Emulator Config

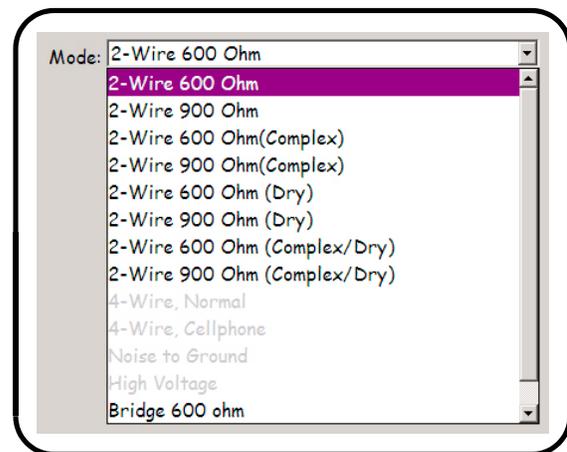
9. To save a log of the test results as seen by the *Terminal* (Director) end, locate the "Log To" window and click on its associated "Configure" button.
10. In the resulting Log Configuration dialog box (See **Figure 5** below), you can:
  - a. Select whether to have the program log the test configuration data
  - b. Change the default log file and path name, as desired.
  - c. When you are done, click the OK button to accept the changes



**Figure 5** — Log Configuration Dialog Box

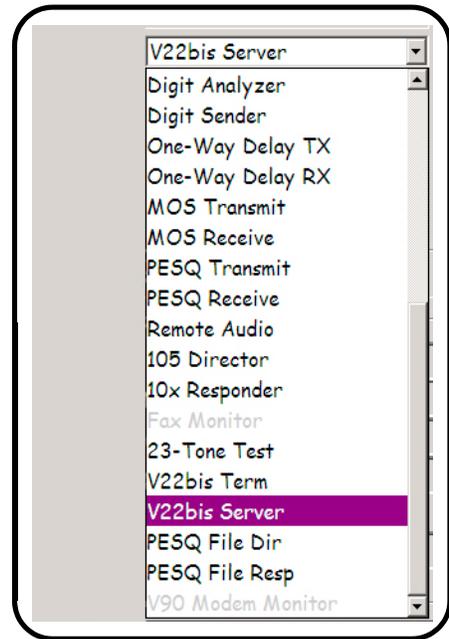
***Configure the Server (Responder) Side***

1. Configure the 960B analog port for 2-Wire 600 ohms
  - a. Click the "Home" button located at the top of the Sage 96x Windows GUI (graphical user interface) screen
  - b. Double-click on the desired test access interface, then click on the "Configure" button located at the left of the display.
  - c. In the resulting display, locate the "Mode:" window, then click on the corresponding drop down arrow, and select "2-Wire 600 Ohm" as illustrated in **Figure 6**, at right.



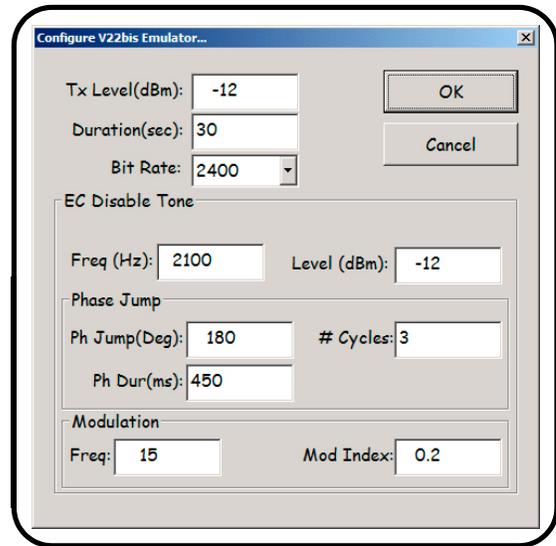
**Figure 6** – Select 2-Wire 600 ohm

2. Click the "Back" button located at the upper left of the display.
3. In the resulting "Span View" window, double-click on the channel 1 line.
4. In the resulting screen, locate the "Test Type" window. Click on its associated drop-down arrow and select "V22bis Server", as shown in **Figure 7**, at right.



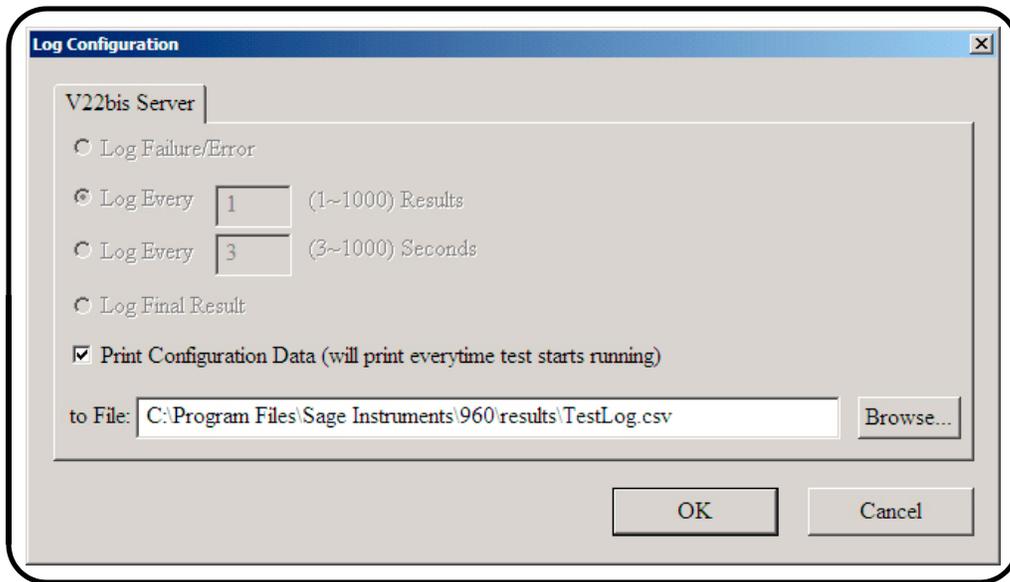
**Figure 7** — Select *V22bis Server*

5. Locate the Configure button associated with the "Test Type" window and click it.
6. You will now see a "Configure V22bis Emulator" dialog box, as shown in **Figure 8**, at right. Here, you can change the
  - a. Transmit signal level
  - b. Test signal duration
  - c. Bit rate to 1200 or 2400 bits-per-second  
*Note:* Insure that your bit rate setting for the Term and Server ends match (i.e. either 1200 or 2400)
  - d. Parameters of the echo canceller disabler signal
7. Once you have made any desired changes, click the OK button to accept them.



**Figure 8** — *Server* Emulator Config

8. To save a log of the test results as seen by the *Server* (Responder) end, locate the "Log To" window and click on its associated "Configure" button.
9. In the resulting Log Configuration dialog box (See **Figure 9** below), you can:
  - a. Select whether to have the program log the test configuration data
  - b. Change the default log file and path name, as desired.
  - c. When you are done, click the OK button to accept the changes



**Figure 9** — Log Configuration Dialog Box

## Start the Test

1. If you are not already at the *Server* (Responder) test screen navigate to it, then click the "Run" button located near the upper right of the screen.
2. Now, navigate to the *Term* (Director) test screen, then click the "Run" button located near the upper right of the screen.
3. As the call progresses, the "VF Test" tab of each end will display the following:
  - a. Major steps of the test
  - b. Number of bit errors detected
  - c. Total number of bits transmitted
  - d. %EVM (error-vector-magnitude)
  - e. A graphical "constellation" display of the received signal

This concludes the description of the V.22bis Modem Emulator test function, and an example setup procedure.

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If you have any questions or comments, please contact Sage Technical Support by e-mail at <technicalsupport@sageinst.com,> or by phone at (831) 761-1000 Option 4.