Option Menu #68 G.168 Digital Network Echo Canceller Test Suite on the Sage 930A-L3, 930i, and 935AT

G.168 Purchase Option

Sage 93X Model	G.168 Purchase Option
Sage 930A-L3	Option 930A-68
Sage 930i	Option 930i-68
Sage 935AT	Option 935AT-568

G.168 Option Description

G.168 is an International Telecommunication Union recommendation for digital network echo canceller tests. Option Menu #: 68 includes 14 tests described in the recommendation. Each test provides a different objective measure of echo canceller performance.

G.168 Option Menu Access

Option Menu #68 G.168 Test Suite

The G.168 tests use two 93X test sets, one on the drop side and one on the line side of an echo canceller. The line side test set sends test signals over the network. The drop side test set generates echoes of the test signals, and for some tests, adds noise. The line side test set measures the resulting echoes, and displays results.

Test Configuration

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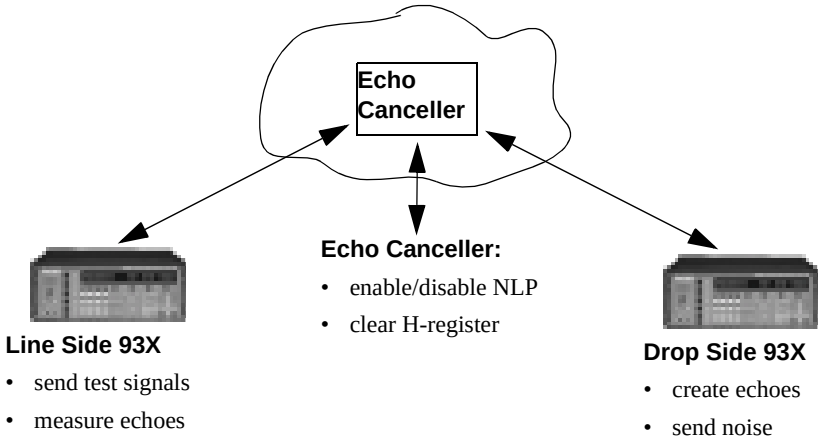


Figure 1 G.168 echo canceller test configuration

You can perform G.168 tests from any location in a network, provided at least one echo canceller is located between the two 93X test sets. The test set must connect to a PCM or 4-wire analog circuit.

NOTE Some tests require access to and control of the echo canceller under test. Specific echo canceller requirements are detailed in the ITU-T G.168 document.

Equipment Setup Procedure

This section describes how to set up two 93X test sets to perform any of the available G.168 tests.

1. Locate one 93X test set on drop side of the echo canceller in the network. Configure the unit to match the circuit in the Trunk Type menu.

   The drop side is connected to R-out and S-in of the echo canceller.

2. Locate one 93X on the line side of the echo canceller in the network.

   The line side is connected to R-in and S-out of the echo canceller.

3. Use the send tone and measure tone functions to verify both directions of the audio signal path.

   For details about using the send and measure tone functions, see the Special Function Keys section in the Front Panel Operation chapter in the 93X operations manual.

Common Test Procedures

Option Menu 68 provides 14 different tests; all use common operating procedures. This section describes the steps common to all tests. Use the steps in this section as a *general* guide to performing G.168 tests.

NOTE Trunk type is set for PCM in the common test procedure examples in this section.

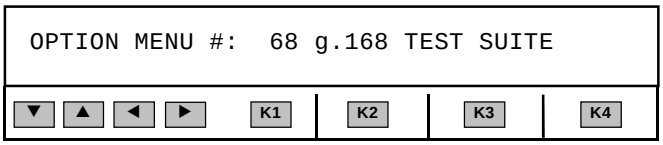
NOTE Requirements unique to each test, if any, are described later in this section.

Drop Side Procedure

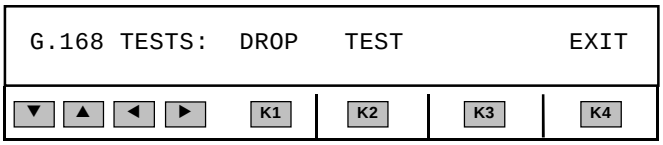
The drop side test set generates echoes from the test signals sent by the line side test set. For some tests the drop side test set also sends noise (either double talk or HOTH noise).

Drop side echo level and delay intervals are specified in the ITU G.168 recommendation. In many cases the ITU recommended values are the 93T test set defaults, however, you can change these if desired.

1 On the drop side 93X test set, select Option Menu #: 68 G.168 Test Suite.



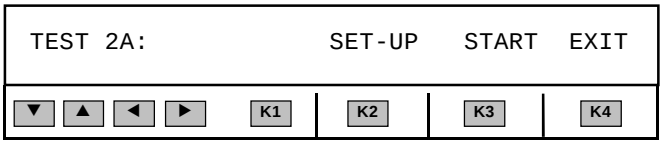
2 Press ENT or any soft key to display the main G.168 menu.



3 Press K1 to select DROP.

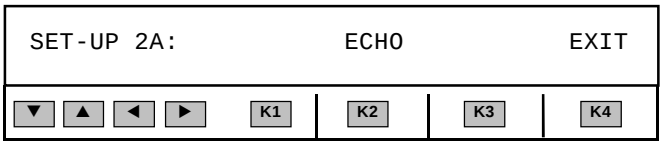
The K1 key toggles between LINE and DROP.

4 Press K2 TEST to select the desired test number.

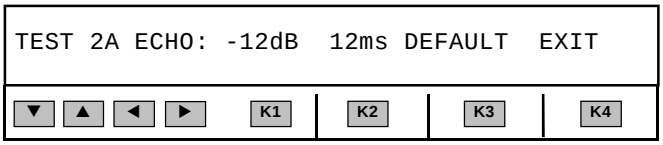


Repeated presses of the up or down arrow keys scroll through available tests. Tests display in number order, as shown in Table 3.

5 Press the K2 SET-UP to set drop side parameters per test. Here, only echo is shown. Additional parameters appear in other tests as required.



6 Press K2 to display the current echo level and delay.



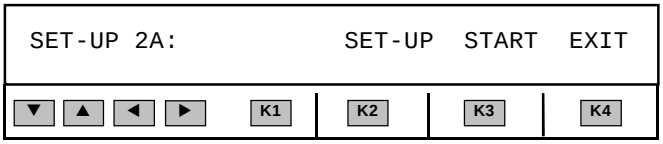
If desired, press K1 to change the echo level, or K2 to change the delay. When the cursor is over the level or delay numbers, you can enter numeric values. Press DEFAULT to select the default value for both parameters.

Valid echo levels are -60 dB to +9 dB. The default level is -12 dB.

Valid delays are between 12 and 600 milliseconds. The default delay is 12 ms.

7 Press K4 EXIT to return to the set-up display.

8 Press K4 EXIT again to return to the test display.



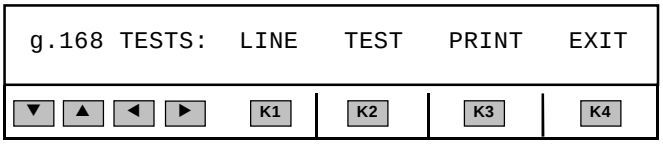
The drop side test set is now ready.

9 Leave the drop side test set in this state and go to the line side test set.

Line Side Procedure

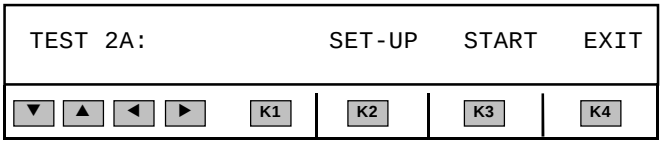
1 On the line side 93X, press the Option Menu function key, and select Option Menu #: 68 G.168 Test Suite.

2 Press the K1 key to select LINE.

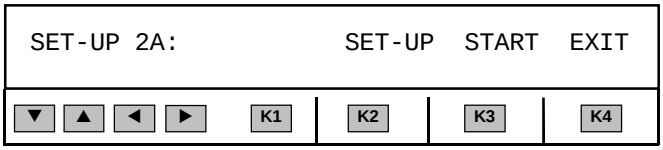


3 Press K2 TEST. Use up and down arrows to select Test 2A.

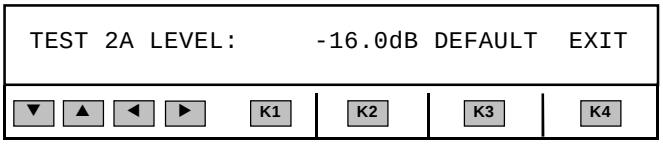
The display reads:



4 Press K2 SET-UP to set line side parameters.



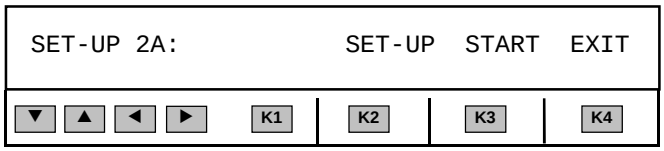
5 Press K2 to display or change the current test signal level.



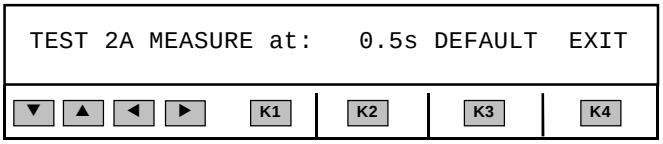
6 If desired, use the numeric keypad to enter a new test signal level., or press K3 to select the default level.

Valid line side test signal levels for each test are provided in Table 2 on page 7.

7 Press K4 EXIT to return to the set-up display.



8 Press K3 TIMING to display the current measurement timing.



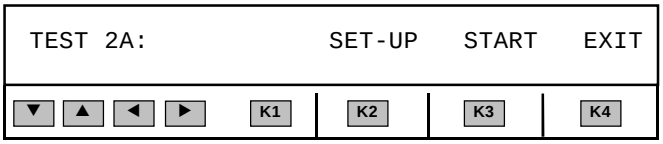
The measurement timing value is the number of seconds from the time the line side 93XAT sends the test signal (i.e., the moment you press START) until the first measurement is taken on the return signal. For tests that take more than one measurement, the number will be displayed and can be changed in the up and down keys.

The Default Time settings are provided in Table 2 on page 7.

Use the numeric keypad to enter a new measurement time, or press K3 to select the default value.

9 Press K4 EXIT to return to the set-up display.

10 Press K4 EXIT again to return to the test display.



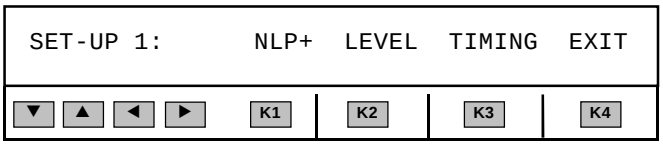
Leave the line side 93XAT test set as it is.

NLP Set-up

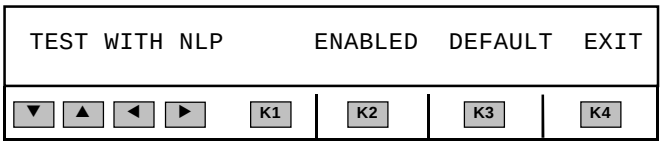
NOTE The NLP set-up parameter displays for tests 1, 2C, 10A, and 10B only.

The NLP set-up parameter displays for tests set for NLP Test is shown as follows.

1 Press the K1 NLP.



2 Press K1 NLP+ to display the nonlinear processor screen.



3 Press K2 to toggle between enabled and disabled.

This setting indicates to the unit whether the echo canceller NLP is enabled or disabled.

THE DEFAULT SETTINGS ARE:

Test No.	Default
1	NLP+ (enabled)
2C	NLP+ (enabled)
10A	NLP- (disabled)
10B	NLP- (disabled)

NOTE The parameter you select on the line side 93X test set does not control the echo canceller NLP. You must use the echo canceller's own control functions to enable or disable its NLP.

Echo Canceller Controls

Access to and control of the echo canceller under test is required for some G.168 tests. For example, some tests must begin with the echo canceller H register set to zero. For some tests the NLP must be disabled. Some tests require a precise delay before sending test signals.

Echo canceller parameters, if required, are defined in the Requirement section for each test in the ITU G.168 document.

Set the specified echo canceller parameters for the selected test.

Starting the Test

Simultaneously press K3 (START) on both the line side and drop side 93X test sets to start a test.

Elapsed time displays on the line side test set when you press START. Measurements begin when the programmed delay expires. When the last measurement begins, elapsed time on the line side unit stops.

Measurements take place automatically, and display on the line side unit when complete.

Overriding the Timed Delay to Manually Start the Test

If desired, you can manually initiate measuring before the defined delay expires. To do this, set the delay time to 99 seconds. Then press K2 MEASURE? before 99 seconds elapse.

Line Side Default Test Parameters

Table 2 Line side G.168 default parmeters for test signal level and delay.

Test	Test Signal Level (dB)	Measure-ment Delay (Seconds)
1	-16	10.1
2A	-16	0.5
2B	-16	0.5
2C	-16	5.8
3A	-16	5.2
3B	-16	5.2
3C	-16	5.6, 6.4, 5.6
4	-16	10
5	-16	10
6	-16	10
7	-16	120
9	-10	30
10A	-13	2.5
10B	-13	10

Drop Side Default Test Parameters

Table 3 Drop side G.168 default parameters for echo signal, echo delay, and noise

Test	Echo Signal Level (dB)	Echo Delay (ms) PCM/analog	Noise Type	Noise Level (dB)	Noise Duration (seconds)
1	-12	12/17	none	n/a	n/a
2A	-12	12/17	none	n/a	n/a
2B	-12	12/17	none	n/a	n/a
2C	-12	12/17	HOTH	-50	5.6
3A	-12	12/17	double talk	-40	5.0
3B	-12	12/17	double talk	-16	5.0
3C	-12	12/17	double talk	-16	#1: 5.6 #2: 6.4 #3: 11.2
4	-12	12/17	none	n/a	n/a
5	-12	12/17 ms delay, 10 sec. duration	none	n/a	n/a
6	-12	12/17	none	n/a	n/a
7	-12	12/17	none	n/a	n/a
9	-8	12/17	HOTH	-45	60
10A	-12	12/17	none	n/a	n/a
10B	-12	12/17	none	n/a	n/a