GEOMETRICS

Seismic Portable
Test System
Model TP
26904-01 Rev. B

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Portable Seismic Test System

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Seismic Test System
Portable System

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This manual describes the operation of the Geometrics Seismic Test System with several Geometrics Seismographs. The system will work with the Geometrics StrataView, Geometrics StrataVisor, the Geometrics Geode and the Geometrics NZ Seismographs. Operation is very similar in all cases.

This shipment may include a software support disk to be installed on your Geometrics seismograph which will enable the use of the Geometrics Portable Test System. If you purchased this portable tester with a Geometrics seismograph this software will already be installed. If you are upgrading your seismic system with the addition of this tester install the software as described below.   It includes menu options for selecting system tests, and performs the test analyses. You should install the software as described below.

This manual will describe how to perform system tests using the Geometrics Seismic Test System.

Installing the New Software (applies only to StrataView seismographs)

Insert the support disk into the StrataView floppy drive. Select Exit to DOS from the Other menu if the StrataView program is running. Then press 999 and ENTER, or type `A:\INSTALL` at the DOS prompt.

Test System Components

The following components are necessary for the Seismic Test System:

Seismic Test System main console
Signal Cables (2)
Battery with power cable
RS-232 cable
Grounding cable
Trigger Cable
Termination Plugs (optional for some systems)
Battery Charger
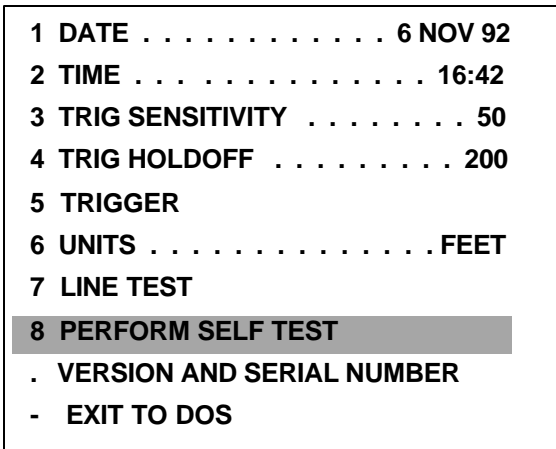Adapter Plug Kit
Carrying Case

Setting up the Test System

Open the top of the main console of the Seismic Test System. Connect the battery cable to the power input connection. Connect the 2 signal cables between the signal connectors of the Geometrics Seismograph and the Seismic Test System, observing the channel labeling. Connect the grounding cable between the ground post on the Test System

and the ground post on the Seismograph. Connect the trigger wire from the Trigger output connector on the Test System and the Trigger input on the Seismograph. Connect the RS-232 cable from the RS-232 port of the Test System and the RS-232 port on the Seismograph. In the case of the Geode, connect the RS-232 cable to a serial port on your controller computer.

The battery should be charged before using the Test System, and after each 8-10 hours of usage.

Running a System Test on the StrataView

Turn on both the Test System and the Seismograph. From the Other menu on the StrataView, select System Test:

GEOMETRY	ACQUISITION	FILE	DISPLAY	DO_SURVEY	ANSWERS	OTHER

```
1  DATE . . . . . . . . . . . . 6 NOV 92
2  TIME . . . . . . . . . . . . . 16:42
3  TRIG SENSITIVITY  . . . . . . . . 50
4  TRIG HOLDOFF  . . . . . . . . . 200
5  TRIGGER
6  UNITS . . . . . . . . . . . . . .FEET
7  LINE TEST
8  PERFORM SELF TEST
.  VERSION AND SERIAL NUMBER
-   EXIT TO DOS
```

Note: You may also wish to make sure that the instrument serial number is set correctly. This is done by selecting the menu option just below the self test option, before running the self test. The instrument serial number is reported in the test results.

Press ENTER, or 8.

The following screen will be shown on the display:

```
┌─────────────────────────────────────────────────┐
│                                                 │
│   ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓                   │
│     MONTHLY.TST                                 │
│                                                 │
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│                                                 │
│                                                 │
│                                                 │
│                                                 │
│                                                 │
│                                                 │
│                                                 │
│  PRESS ENTER KEY TO BEGIN TESTING SELECTED TEST │
│                                                 │
│                                                 │
└─────────────────────────────────────────────────┘
```

This menu shows the installed test suites. Users may create their own custom test suites, if desired. Please contact Geometrics for more technical information on customizing the tests, or having Geometrics create custom tests. **DO NOT MODIFY THE FILE MONTHLY.TST.**

Pressing the ENTER key will show the following display for an RX seismograph

* TEST 1 NOISE 48dB, 2ms	* TEST 12 XF ODD 0dB, 1ms, 190Hz
* TEST 2 NOISE 48dB, 1/4ms	* TEST 13 XF EVEN 0dB, 1ms, 190Hz
* TEST 3 NOISE 0dB, 1/4ms	* TEST 14 XF ODD 48dB, 1ms, 190Hz
* TEST 4 NOISE 0dB, 2ms	* TEST 15 XF EVEN 48dB, 1ms, 190Hz
* TEST 5 THD 0dB, 2ms, 24Hz	* TEST 16 CMR 0dB, 1ms, 190Hz
* TEST 6 THD 48dB, 2ms, 24Hz	* TEST 17 CMR 48dB, 1ms, 190Hz
* TEST 7 ACC/SIM 48dB, 1ms, 24Hz	* TEST 18 TIMING 24dB, 1/2ms
* TEST 8 ACC/SIM 36dB, 1ms, 24Hz	* TEST 19 BW 24dB, 2ms
* TEST 9 ACC/SIM 24dB, 1ms, 24Hz	* TEST 20 LC 25Hz FILTER 24dB, 2ms
* TEST 10 ACC/SIM 0dB, 1ms, 24Hz	* TEST 21 HC 250Hz FILTER 24dB, 1ms
* TEST 11 THD 0dB, 1/2ms, 190Hz	* TEST 22 NOTCH 50 Hz 24dB, 2ms

USE . KEY TO SELECT/DESELECT ONE TEST.
USE - KEY TO SELECT/DESELECT ALL TESTS.
USE ENTER KEY TO COMPLETE SELECTION AND BEGIN TESTING, CLR ABORTS

or this display for an R seismograph

* TEST 1 NOISE 2mS	* TEST 12 BW 1/2mS
* TEST 2 NOISE 1/4mS	* TEST 13 LC 25Hz FILTER 2mS
* TEST 3 NOISE 1/16mS	* TEST 14 HC 500Hz FILTER 1/8m
* TEST 4 THD 2mS, 23Hz NFS	* TEST 15 NOTCH 50Hz 2mS
* TEST 5 THD 2mS, 23Hz Low-level	
* TEST 6 ACC/SIM 1/2mS, 190Hz	
* TEST 7 THD 1/2mS, 190Hz NFS	
* TEST 8 XFD ODD 1mS, 190Hz	
* TEST 9 XFD EVEN 1mS, 190Hz	
* TEST 10 CMR 1mS, 190Hz	
* TEST 11 TIMING 1/2mS	

USE . KEY TO SELECT/DESELECT ONE TEST.
USE – KEY TO SELECT/DESELECT ALL TESTS.
USE ENTER KEY TO COMPLETE SELECTION AND BEGIN TESTING, CLR ABORTS.

This screen allows you to select the desired tests. By default, all tests are selected. Pressing the - key will toggle all selections, and pressing the . key will toggle the highlighted selection.

Pressing ENTER will bring up the following dialog box and entry box:

```
SELECT LINE FREQUENCY TO BE REJECTED
PRESS ENTER TO CONTINUE
OR CLR TO ABORT TESTING.
```

| 16.67 Hz | 50.0Hz | 60.0Hz | NONE |

This will determine the notch frequencies that are used to reject AC power line noise in the analysis of the test data.

Pressing ENTER will start the tests. More informational dialog boxes may be shown depending upon conditions. The full suite of tests takes about 15 minutes. Pressing the ESC key twice will abort the tests.

When completed, a summary version of the test report will be printed out. A longer report, detailing full test results, is saved on the hard disk.

Running a System Test on the Geode or Geometrics NZ

From the Main Menu:

Geometrics StrataVisor NX - NX_LAND_Survey.0000.log

Survey   Geom   Observer   Acquisition   File   Display   DoSurvey   Window   Answers   Print   System

Choose System / Test / Run Analog Test:

| y Window Answers Print	System		
	1 Set Date/Time/Units	02/05/2001 15:49:12, Feet	
	2 Trigger Options	Holdoff 0.2s, AUTO ARM, Sensitivity 50, Self Trigger OFF	
1 Run Analog Test	3 Test		▶
2 Run Geophone Test	4 Attach Slave(s)		
3 Run Digital Test	5 Serial I/O		▶
4 View Board Status	6 Manual Trigger		
5 Trouble Shooting Net			
	8 Version Number	3.89	
	9 Close and Shut Down Windows NT		

The following dialog box will appear:
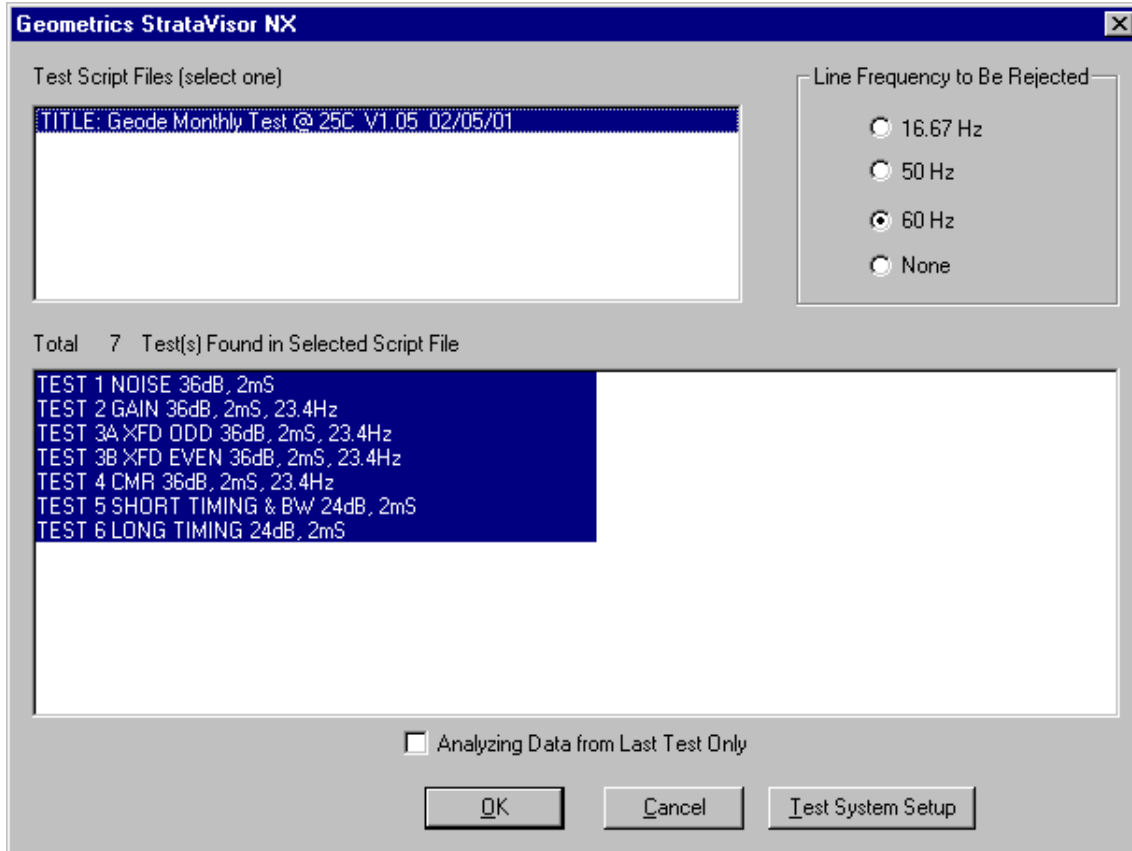
Choose the line frequency to be rejected, choose the tests you wish to perform (all are selected by default), and click on OK. The tests will automatically be run.

If you choose Test System Setup, you will have the opportunity to select the COM port as shown below:
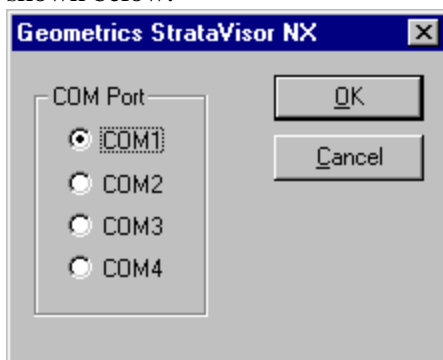
File Locations

Test files are saved in the directory `D:\TEST_DIR`. The long report is named `LONG.RPT` and the short report is named `SHORT.RPT`. This is also where the actual data files are stored. All files (data and report files) are overwritten each time the test is run, so save them in a different directory if you wish to preserve previous test results.

Description of Tests for the StrataView RX Seismographs

The following is a description of the tests performed.

TEST 1 NOISE 48dB, 2ms
> Measures the DC offset and AC RMS noise with the input connections terminated.
> 48 dB gain, 2 ms sampling rate.
> Limits: DC offset less than 0.40uV, AC RMS less than 1.0 uV.

TEST 2 NOISE 48dB, 1/4ms
> Same as test 1.
> 48 dB gain, 1/4 ms sampling rate.
> Limits: DC offset less than 0.40uV, AC RMS less than 1.5 uV.

TEST 3 NOISE 0dB, 1/4ms
> Same as test 1.
> 0 dB gain, 1/4 ms sampling rate.
> Limits: DC offset less than 200 uV, AC RMS less than 35 uV.

TEST 4 NOISE 0dB, 2ms
> Same as test 1.
> 0 dB gain, 2 ms sampling rate.
> Limits: DC offset less than 100 uV, AC RMS less than 6.3 uV.

TEST 5 THD 0dB, 2ms, 23Hz
> Measures total harmonic distortion by applying an 23 Hz input signal.
> 0 dB gain, 2 ms sampling rate.
> Limits: Less than 0.001 percent.

TEST 6 THD 48dB, 2ms, 23Hz
> Same as test 5.
> 48 dB gain, 2 ms sampling rate.
> Limits: Less than 0.005 percent.

TEST 7 ACC/SIM 48dB, 1ms, 23Hz
> Measures gain accuracy and gain and phase similarity by applying a 23 Hz input signal. Gain accuracy is the absolute accuracy of each channel. Gain and phase similarity are the difference between the measured amplitude of a particular channel with the median amplitude measured by all the channels.
> 48 dB gain, 1 ms sampling rate.
> Limits: Gain accuracy, 3.0%. Gain similarity, 1.0%. Phase similarity, 0.88 deg.

TEST 8 ACC/SIM 36dB, 1ms, 24Hz
> Same as test 7.
> 36 dB gain, 1 ms sampling rate.
> Limits: Gain accuracy, 3.0%. Gain similarity, 1.0%. Phase similarity, 0.88 deg.

TEST 9 ACC/SIM 24dB, 1ms, 24Hz
> Same as test 7.
> 24 dB gain,1 ms sampling rate.

Limits: Gain accuracy, 3.0%. Gain similarity, 1.0%. Phase similarity, 0.88 deg.

TEST 10 ACC/SIM 0dB, 1ms, 24Hz

Same as test 7.

0 dB gain, 1 ms sampling rate.

Limits: Gain accuracy, 3.0%. Gain similarity, 1.0%. Phase similarity, 0.88 deg.

TEST 11 THD 0dB, 1/2ms, 190Hz

Measures total harmonic distortion by applying a 190 Hz input sine wave.

0 dB gain, ½ ms sampling rate.

Limits: 0.001 percent.

TEST 12 XF ODD 0dB, 1ms, 190Hz

Measures crossfeed rejection from odd to even channels, by applying a 190 Hz input signal.

0 dB gain, 1 ms sampling rate.

Limits: 110 dB

TEST 13 XF EVEN 0dB, 1ms, 190Hz

Measures crossfeed rejection from even to odd channels, by applying a 190 Hz input signal.

0 dB gain, 1 ms sampling rate.

Limits: 110 dB

TEST 14 XF ODD 48dB, 1ms, 190Hz

Same as test 12.

48 dB gain, 1 ms sampling rate.

Limits: 110 dB

TEST 15 XF EVEN 48dB, 1ms, 190Hz

Same as test 13.

48 dB gain, 1 ms sampling rate.

Limits: 110 dB

TEST 16 CMR 0dB, 1ms, 190Hz

Measures common mode rejection by applying a 190 Hz input signal.

0 dB gain, 1 ms sampling rate.

Limits: 70 dB

TEST 17 CMR 48dB, 1ms, 190Hz

Same as test 16.

48 dB gain, 1 ms sampling rate.

Limits: 90 dB

TEST 18 TIMING 24dB, 1/2ms

Measures timing accuracy by applying a delayed pulse.

24 dB gain, ½ ms sampling rate.

Limits: 500 us.

TEST 19 BW 24dB, 2ms

Measures bandwidth by applying an input pulse signal.

24 dB gain, 2 ms sampling rate.

Limits: Lower 3dB freq 0.1 to 0.5 Hz. Upper 3dB 200 to 210 Hz.

TEST 20 LC 25Hz FILTER 24dB, 2ms

Checks the 25 Hz Low Cut acquisition filter function, using an input pulse signal.

24 dB gain, 2 ms sampling rate.

Limits: Lower 3dB freq   24.375 Hz to 25.625 Hz.

TEST 21 HC 250Hz FILTER 24dB, 1ms

Checks the 250 Hz High Cut acquisition filter function.

24 dB gain, 2 ms sampling rate.

Limits: Upper 3dB frequency 241.800 Hz to 254.200 Hz.

TEST 22 NOTCH 50 Hz 24dB, 2ms

Checks the 50 Hz Notch acquisition filter function.

24 dB gain, 2 ms sampling rate.

Limits: 3dB width less than 20.0 Hz, Upper 40dB freq > 50.25 Hz, lower 40 dB frequency less than 49.75 Hz,

Description of Tests for the StrataView R Seismographs

The following is a description of the tests performed.

TEST 1 NOISE, 2ms

Measures the DC offset and AC RMS noise with the input connections terminated.

2 ms sampling rate.

Limits: DC offset less than 0.01 mV, AC RMS less than 0.0008 mV.

TEST 2 NOISE, 1/4ms

Same as test 1.

1/4 ms sampling rate.

Limits: DC offset less than 0.01 mV, AC RMS less than 0.001 mV.

TEST 3 NOISE, 1/16ms

Same as test 1.

1/4 ms sampling rate.

Limits: DC offset less than 0.01 mV, AC RMS less than 0.0014 mV.

TEST 4 THD, 2ms, 23Hz NFS

Measures total harmonic distortion by applying an 23 Hz input signal.

2 ms sampling rate.

Limits: Less than 0.012 percent.

TEST 5THD, 2ms, 23Hz Low-level

Same as test 5.

2 ms sampling rate.

Limits: Less than 0.05 percent.

TEST 6ACC/SIM, 1/2ms, 190Hz

Measures gain accuracy and gain and phase similarity by applying a 190 Hz input signal. Gain accuracy is the absolute accuracy of each channel. Gain and phase similarity are the difference between the measured amplitude of a particular channel with the median amplitude measured by all the channels.

1/2 ms sampling rate.

Limits: Gain accuracy, 5.0%. Gain similarity, 2.5%. Phase similarity, 3.42 deg.

TEST 7 THD, 1/2ms, 190Hz   NFS

Measures total harmonic distortion by applying a 190 Hz input sine wave.

1/2 ms sampling rate.

Limits: 0.012 percent.

TEST 8 XFD ODD, 1ms, 190Hz

Measures crossfeed rejection from odd to even channels, by applying a 190 Hz input signal.

1 ms sampling rate.

Limits: 73 dB

TEST 9 XFD EVEN, 1ms, 190Hz

Measures crossfeed rejection from even to odd channels, by applying a 190 Hz input signal.

1 ms sampling rate.

Limits: 73 dB

TEST 10 CMR, 1ms, 190Hz

Measures common mode rejection by applying a 190 Hz input signal.

1 ms sampling rate.

Limits: 90 dB

TEST 11 TIMING, 1/2ms

Measures timing accuracy by applying a delayed pulse.

1/2 ms sampling rate.

Limits: 500 us.

TEST 12 BW, 1/2ms

Measures bandwidth by applying an input pulse signal.

1/2 ms sampling rate.

Limits: Lower 3dB freq 2.15 to 3.65 Hz. Upper 3dB 605 to 635 Hz.

TEST 13 LC 25Hz FILTER, 2ms

Checks the 25 Hz Low Cut acquisition filter function, using an input pulse signal.

2 ms sampling rate.

Limits: Lower 3dB freq   24.375 Hz to 25.625 Hz.

TEST 14 HC 500Hz FILTER, 1/8ms

Checks the 500 Hz High Cut acquisition filter function.

1/8 ms sampling rate.

Limits: Upper 3dB frequency 487.500 Hz to 512.500 Hz.

TEST 15 NOTCH 50 Hz, 2ms

Checks the 50 Hz Notch acquisition filter function.

2 ms sampling rate.

Limits: 3dB width less than 20.0 Hz, Upper 40dB freq > 50.25 Hz, lower 40 dB frequency less than 49.75 Hz.

Description of Tests for the Geode and Geometrics NZ Seismographs

TITLE: Geode Monthly Test @ 25C V1.05 02/05/01

TEST 1 NOISE 36dB, 2mS

Measures the DC offset and AC RMS noise with the input connections terminated.
2 ms sampling rate, 36dB gain.

Limits: DC offset less than 0.00015 mV, AC RMS less than 0.00023 mV.

TEST 2 GAIN 36dB, 2mS, 23.4Hz

Measures gain accuracy and Total Harmonic Distortion at a 23.4 Hz input signal
2mS sample rate.

Limits: Gain accuracy 0.5 percent similarity, THD less than 0.002%

TEST 3A XFD ODD 36dB, 2mS, 23.4Hz

Measures Crossfeed into the even channels, driving the odd channels with 23.4 Hz

Limit: more than 105dB down

TEST 3B XFD EVEN 36dB, 2mS, 23.4Hz

Measures Crossfeed into the odd channels, driving the even channels with 23.4 Hz

Limit: more than 105dB down

TEST 4 CMR 36dB, 2mS, 23.4Hz

Applies a 23.4 Hz common mode signal

Limits: greater than 98 dB down

TEST 5 SHORT TIMING & BW 24dB, 2mS

Measures timing accuracy and bandwidth by applying a short pulse signal 64 ms from
the trigger.

Timing accuracy limit is less than 232.2 us

Low frequency cutoff should be 1.73 to 1.77 Hz

High frequency cutoff should be within 2% of 208.3 Hz.

TEST 6 LONG TIMING 24dB, 2mS

Measures timing accuracy for a pulse 32 seconds from the trigger.

Timing accuracy limit is less than 711.3 us

Summary Output File for the StrataView RX Seismographs

The following is an example of the short form which is printed at the completion of the tests:

```
TEST REPORT
DATE: 27/JUN/96   TIME: 15:12:21    INSTRUMENT SERIAL NO. 654321


TITLE: StrataView RX Monthly Test  V1.20  6/27/96


TEST 1 NOISE 48dB, 2mS
DC OFFSET SPECIFICATION ( <  0.00040 mV )                        PASSED
AC RMS SPECIFICATION ( <  0.00100 mV )                           PASSED


TEST 2 NOISE 48dB, 1/4mS
DC OFFSET SPECIFICATION ( <  0.00040 mV )                        PASSED
AC RMS SPECIFICATION ( <  0.00150 mV )                           PASSED


TEST 3 NOISE 0dB, 1/4mS
DC OFFSET SPECIFICATION ( <  0.20000 mV )                        PASSED
AC RMS SPECIFICATION ( <  0.03500 mV )                           PASSED
```

```
TEST 4 NOISE 0dB, 2mS
DC OFFSET SPECIFICATION ( <  0.10000 mV )                              PASSED
AC RMS SPECIFICATION ( <  0.00630 mV )                                 PASSED


TEST 5 THD 0dB, 2mS, 23Hz
HARMONIC DISTORTION SPECIFICATION ( <  0.00100 % )                     PASSED


TEST 6 THD 48dB, 2mS, 23Hz
HARMONIC DISTORTION SPECIFICATION ( <  0.00500 % )                     PASSED


TEST 7 ACC/SIM 48dB, 1mS, 23Hz
GAIN ACCURACY SPECIFICATION ( <  3.00000% )                           PASSED
GAIN SIMILARITY SPECIFICATION ( <  1.00000% )                         PASSED
PHASE SIMILARITY SPECIFICATION ( <  0.88000 DEGREE )                   PASSED


TEST 8 ACC/SIM 36dB, 1mS, 23Hz
GAIN ACCURACY SPECIFICATION ( <  3.00000% )                           PASSED
GAIN SIMILARITY SPECIFICATION ( <  1.00000% )                         PASSED
PHASE SIMILARITY SPECIFICATION ( <  0.88000 DEGREE )                   PASSED


TEST 9 ACC/SIM 24dB, 1mS, 23Hz
GAIN ACCURACY SPECIFICATION ( <  3.00000% )                           PASSED
GAIN SIMILARITY SPECIFICATION ( <  1.00000% )                         PASSED
PHASE SIMILARITY SPECIFICATION ( <  0.88000 DEGREE )                   PASSED


TEST 10 ACC/SIM 0dB, 1mS, 23Hz
GAIN ACCURACY SPECIFICATION ( <  3.00000% )                           PASSED
GAIN SIMILARITY SPECIFICATION ( <  1.00000% )                         PASSED
PHASE SIMILARITY SPECIFICATION ( <  0.88000 DEGREE )                   PASSED


TEST 11 THD 0dB, 1/2mS, 190Hz
HARMONIC DISTORTION SPECIFICATION ( <  0.00100 % )                     PASSED


TEST 12 XF ODD 0dB, 1mS, 190Hz
CROSS TALK REJECTION SPECIFICATION ( > 110.00 dB )                     PASSED


TEST 13 XF EVEN 0dB, 1mS, 190Hz
CROSS TALK REJECTION SPECIFICATION ( > 110.00 dB )                     PASSED


TEST 14 XF ODD 48dB, 1mS, 190Hz
CROSS TALK REJECTION SPECIFICATION ( > 100.00 dB )                     PASSED


TEST 15 XF EVEN 48dB, 1mS, 190Hz
CROSS TALK REJECTION SPECIFICATION ( > 100.00 dB )                     PASSED


TEST 16 CMR 0dB, 1mS, 190Hz
COMMON MODE REJECTION SPECIFICATION ( >  70.00 dB )                    PASSED


TEST 17 CMR 48dB, 1mS, 190Hz
COMMON MODE REJECTION SPECIFICATION ( >  90.00 dB )                    PASSED


TEST 18 TIMING 24dB, 1/2mS
TIMING SPECIFICATION ( ABSOLUTE DEVIATION <     500.00 usec )          PASSED


TEST 19 BW 24dB, 2mS
```

```
LOWER CORNER FREQ SPEC AT 3 dB ( >   0.100 Hz & <   0.500 Hz )          PASSED
UPPER CORNER FREQ SPEC AT 3 dB ( > 200.000 Hz & < 210.000 Hz )          PASSED


TEST 20 LC 25Hz FILTER 24dB, 2mS
LOWER CORNER FREQ SPEC AT 3 dB ( >  24.375 Hz & <  25.625 Hz )          PASSED

TEST 21 HC 250Hz FILTER 24dB, 1mS
UPPER CORNER FREQ SPEC AT 3 dB ( > 241.800 Hz & < 254.200 Hz )          PASSED

TEST 22 NOTCH 50Hz 24dB, 2mS
NOTCH FILTER SPEC AT 3 dB (WIDTH <  20.000 Hz)                          PASSED
NOTCH FILTER SPEC AT 40 dB (UPPER >  50.250 Hz & LOWER <  49.750 Hz)    PASSED

TEST RESULT                                              ALL TESTS PASSED
```

Summary Output File for the StrataView R Seismographs

The following is an example of the short form which is printed at the completion of the tests:

```
TEST REPORT
DATE: 2/JUL/98   TIME: 16:33:41   INSTRUMENT SERIAL NO. 0000
TOTAL 24 CHANNELS TESTED

TITLE: StrataView R Monthly Test  V1.20  5/27/98

TEST 1 NOISE  2mS
DC OFFSET SPECIFICATION ( < 0.010000 mV )                               PASSED
AC RMS SPECIFICATION ( < 0.000800 mV )                                  PASSED

TEST 2 NOISE  1/4mS
DC OFFSET SPECIFICATION ( < 0.010000 mV )                               PASSED
AC RMS SPECIFICATION ( < 0.001000 mV )                                  PASSED

TEST 3 NOISE  1/16mS
DC OFFSET SPECIFICATION ( < 0.010000 mV )                               PASSED
AC RMS SPECIFICATION ( < 0.001400 mV )                                  PASSED

TEST 4 THD  2mS, 23Hz NFS
HARMONIC DISTORTION SPECIFICATION ( <  0.01200 % )                      PASSED

TEST 5 THD  2mS, 23Hz Low-level
HARMONIC DISTORTION SPECIFICATION ( <  0.05000 % )                      PASSED

TEST 6 ACC/SIM  1/2mS, 190Hz
GAIN ACCURACY SPECIFICATION ( <  5.00000% )                            PASSED
GAIN SIMILARITY SPECIFICATION ( <  2.50000% )                          PASSED
PHASE SIMILARITY SPECIFICATION ( <  3.42000 DEGREE )                    PASSED

TEST 7 THD  1/2mS, 190Hz NFS
HARMONIC DISTORTION SPECIFICATION ( <  0.01200 % )                      PASSED

TEST 8 XFD ODD  1mS, 190Hz
CROSS TALK REJECTION SPECIFICATION ( >  73.00 dB )                      PASSED
```

```
TEST 9 XFD EVEN  1mS, 190Hz
CROSS TALK REJECTION SPECIFICATION ( >  73.00 dB )                      PASSED


TEST 10 CMR  1mS, 190Hz
COMMON MODE REJECTION SPECIFICATION ( >  90.00 dB )                     PASSED


TEST 11 TIMING  1/2mS
TIMING SPECIFICATION ( ABSOLUTE DEVIATION <    500.00 usec )            PASSED


TEST 12 BW  1/2mS
LOWER CORNER FREQ SPEC AT 3 dB ( >   2.150 Hz & <   3.650 Hz )          PASSED
UPPER CORNER FREQ SPEC AT 3 dB ( > 605.000 Hz & < 635.000 Hz )          PASSED


TEST 13 LC 25Hz FILTER 2mS
LOWER CORNER FREQ SPEC AT 3 dB ( >  24.375 Hz & <  25.625 Hz )          PASSED


TEST 14 HC 500Hz FILTER  1/8mS
UPPER CORNER FREQ SPEC AT 3 dB ( > 487.500 Hz & < 512.500 Hz )          PASSED


TEST 15 NOTCH 50Hz  2mS
NOTCH FILTER SPEC AT 3 dB (WIDTH <  20.000 Hz)                          PASSED
NOTCH FILTER SPEC AT 40 dB (UPPER >  50.250 Hz & LOWER <  49.750 Hz)    PASSED


TEST RESULT                                            ALL TESTS PASSED
```

Summary Output File for the Geode and Geometrics NZ Seismographs

```
TEST REPORT
DATE: 05/Feb/01  TIME: 14:14:01
TOTAL 56 CHANNELS TESTED


TITLE: Geode Monthly Test @ 25C  V1.05a  02/05/01


TEST 1 NOISE 36dB, 2mS


FILE 9019
DC OFFSET SPECIFICATION ( < 0.000150 mV )                              PASSED
AC RMS SPECIFICATION ( < 0.000230 mV )                                 PASSED


TEST 2 GAIN 36dB, 2mS, 23.4Hz


FILE 9120
GAIN ACCURACY SPECIFICATION ( < 150.00000% )                          PASSED
GAIN SIMILARITY SPECIFICATION ( <   0.50000% )                        PASSED
HARMONIC DISTORTION SPECIFICATION ( <   0.00200 % )                    PASSED


FILE 9120
PHASE SIMILARITY SPECIFICATION ( < 0.800 DEG )                         PASSED


TEST 3A XFD ODD 36dB, 2mS, 23.4Hz


FILE 9239
CROSS TALK REJECTION SPECIFICATION ( > 105.00 dB )                     PASSED
```

```
TEST 3B XFD EVEN 36dB, 2mS, 23.4Hz

FILE 9240
CROSS TALK REJECTION SPECIFICATION ( > 105.00 dB )                      PASSED


TEST 4 CMR 36dB, 2mS, 23.4Hz

FILE 9320
COMMON MODE REJECTION SPECIFICATION ( >  98.00 dB )                     PASSED


TEST 5 SHORT TIMING & BW 24dB, 2mS

FILE 9408
TIMING SPECIFICATION ( ABSOLUTE DEVIATION <     232.20 usec )           PASSED


FILE 9408
LOWER CORNER FREQ SPEC AT 3 dB ( >   1.550 Hz & <   1.950 Hz )          PASSED
UPPER CORNER FREQ SPEC AT 3 dB ( > 204.140 Hz & < 212.460 Hz )         PASSED


TEST 6 LONG TIMING 24dB, 2mS

FILE 9508
TIMING SPECIFICATION ( ABSOLUTE DEVIATION <     711.30 usec )           PASSED

TEST RESULT                                                  ALL TESTS PASSED
```

Long Form Output File

The long form report is automatically saved on the disk. It is too long to show here, but it gives the exact measurements for each channel.

If the System Fails Any Tests

There are many situations which might cause some of the tests to fail. The first thing to check is that the cables are securely connected. Disconnect, clean and reconnect the cable connections. Clean cable connections are particularly important for the common mode rejection test. The grounding cable is also particularly important for common mode tests. Without it, the reports will indicate untrue, exceptionally good, results.

Too much AC line pickup is another possible cause for erroneous results. Make sure AC power cords are as far as possible from the unit. Try disconnecting any AC-powered instruments nearby (monitors, printers, tape drives, etc.), and run the seismograph from a battery, if necessary.

Also make sure that digital cables, such as the RS-232 cable, are not routed near to the signal cables.   Other situations that can cause failures of certain tests are: power voltage variations, ground loops, temperature extremes or variations, mechanical shocks, or excessive humidity.

The gain accuracy test may fail if both signal cables are not connected between the StrataView and the Test System Console. This is because the test signal will not be the correct amplitude without the proper load. Always have both signal cables connected, even if you are only testing some of the channels.

The system may report certain error messages regarding communications with the test system console. In this case, check the connection of the RS-232 cable. In extreme situations, you may require an upgrade to the RS-232 port on your StrataView. Please contact Geometrics if the test suite regularly fails to complete due to communication problems.

Occasional statistical variations may cause a channel to fail the specifications slightly. Repeated testing can assure that the channel is indeed performing properly if it passes the great majority of repeated tests. Consistent failures indicate a need to replace the corresponding acquisition board.

The test box itself may be suspected to be malfunctioning if all the channels show degraded performance. If cabling or internal relays malfunction, swapping the signal cable connections at the seismograph, and repeating the test will show a migration of the failures. (With the signals wired thusly, the crossfeed tests will be inverted, so that all channels will be flagged as failing).

If a 48-channel Test System is used to test a 60-channel StrataView, the middle 12 channels (numbers 25 through 36) will not be tested.

Other Information

The test system will operate with the best performance if it is powered by its own battery. It may be powered in parallel with the seismograph battery, if necessary, with only slight, if any, degradation..

During testing, after the data acquisition is complete, and while data analysis is underway, it is safe to switch off and disconnect the Test Console. This may save some time if more than one seismographs are to be tested.

When contacting Geometrics to report testing problems, please be prepared to communicate the long form report that illustrates the problem. This will help our engineers spot the source of the failure.