



# Bird Dog II System

## Geophone Test Unit



## User's Manual

## **Bird Dog II System User's Manual**

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### **Seismic Source Co.**

2391 E. Coleman Rd  
Ponca City, OK 74604  
USA

Telephone: (580) 762-8233

Fax: (580) 762-1785

Email: [mail@seismicsource.com](mailto:mail@seismicsource.com)

[www.seismicsource.com](http://www.seismicsource.com)

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# 1 Introduction

## 1.1 System Description

The Bird Dog II system is an independent analog to digital acquisition system, especially designed for quality control testing and repair of seismic geophone units and geophone strings.

The Bird Dog II System consists of the following:

- DAQLink Unit – Digital to Analog converter unit with Ethernet interface. DAQLink-II is a 24 bit acquisition unit, with each box containing up to 24 channels. The Bird Dog II requires only 2 channels. The Bird Dog II also uses the 16 bit D/A output of the DAQLink II unit.
- Computer – The DAQ Link unit connects to a computer with Windows 98, Windows XP, Windows NT or Windows 2000 operating system and an Ethernet Network Interface Card (NIC).
- Bird Dog II software operates on the computer and communicates to the DAQ Link unit. The Software package allows viewing, analysis, and storage of the acquired signals.
- Connection cables are included to connect:
  - Power (11-18 VDC)
  - Geophone being tested
  - Leakage cable to test leakage of geophone string
  - Ethernet cable to connect DAQLink II to computer

## 1.2 Bird Dog Software Installation and Setup

Create a new directory on the hard drive and copy all files from installation CD to that directory

- GeoTest.exe – Geophone Test program used to analyze and store the geophone test signals and results.

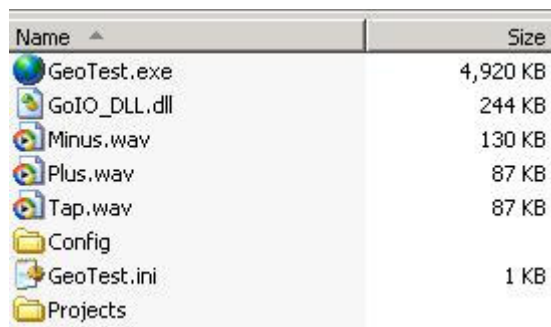
## 1.3 GeoTest version 2.68 and newer

To operate the GeoTest program requires:

- GeoTest.exe – this main executable program
- GoIO\_DLL.dll – this is used with optional temperature sensor, and is required
- Minus.wav – wav files for Polarity TAP tests
- Plus.wav
- Tap.wav

The \*.wav files can be changed to a different language or sound. These files must have the minus.wav, plus.wav, and tap.wav names to be used by the program.

After running GeoTest the program directory should look as follows:



Name	Size
GeoTest.exe	4,920 KB
GoIO_DLL.dll	244 KB
Minus.wav	130 KB
Plus.wav	87 KB
Tap.wav	87 KB
Config	
GeoTest.ini	1 KB
Projects	

## 2 Ethernet Setup

When computer is not connected to a local area network (LAN) it is necessary to set up a fixed TCP/IP address for the computer to communicate with the DAQLink II unit.

With Windows XP computer this can be done by the following procedure:

Go to the Control Panel Window

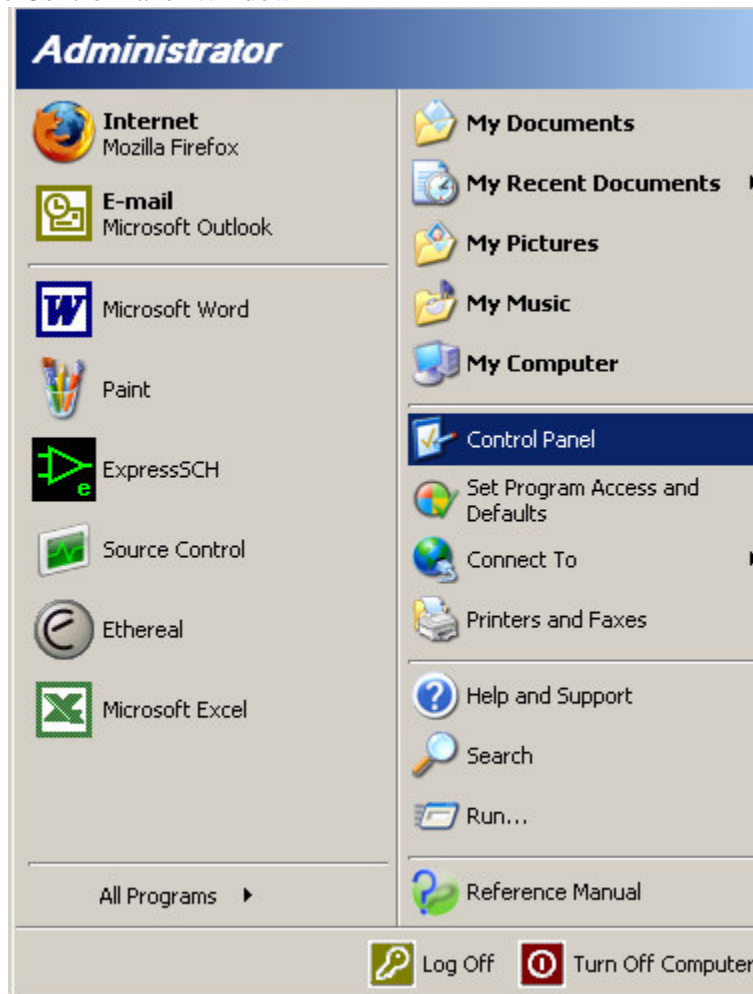
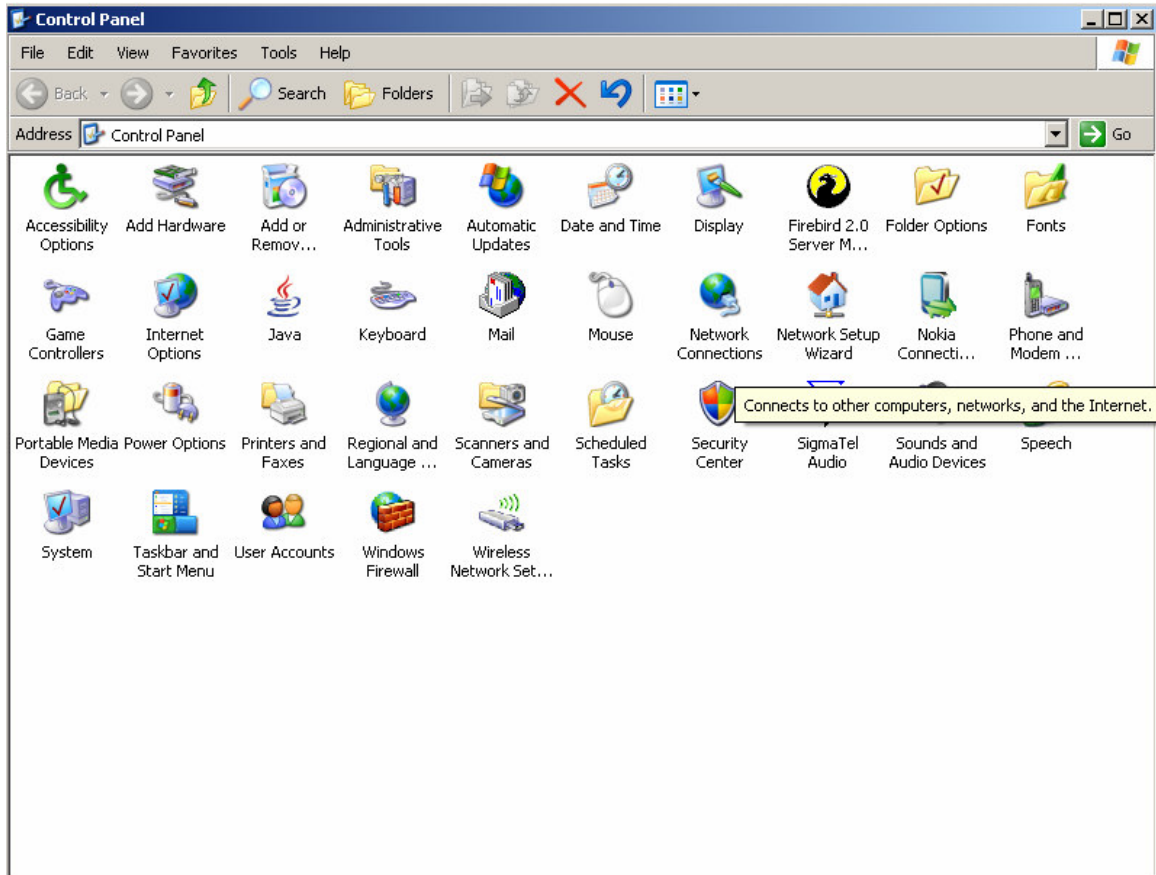


Figure 2.1 Control Panel





Double Click on an icon that corresponds to your network connections

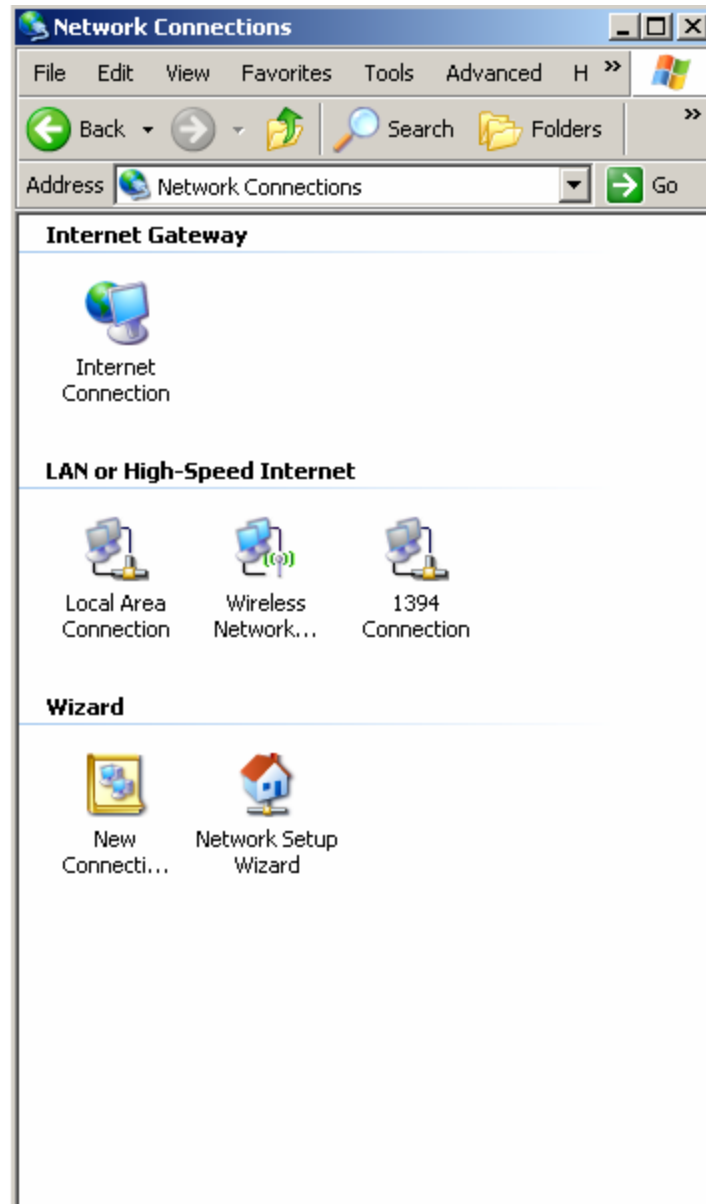
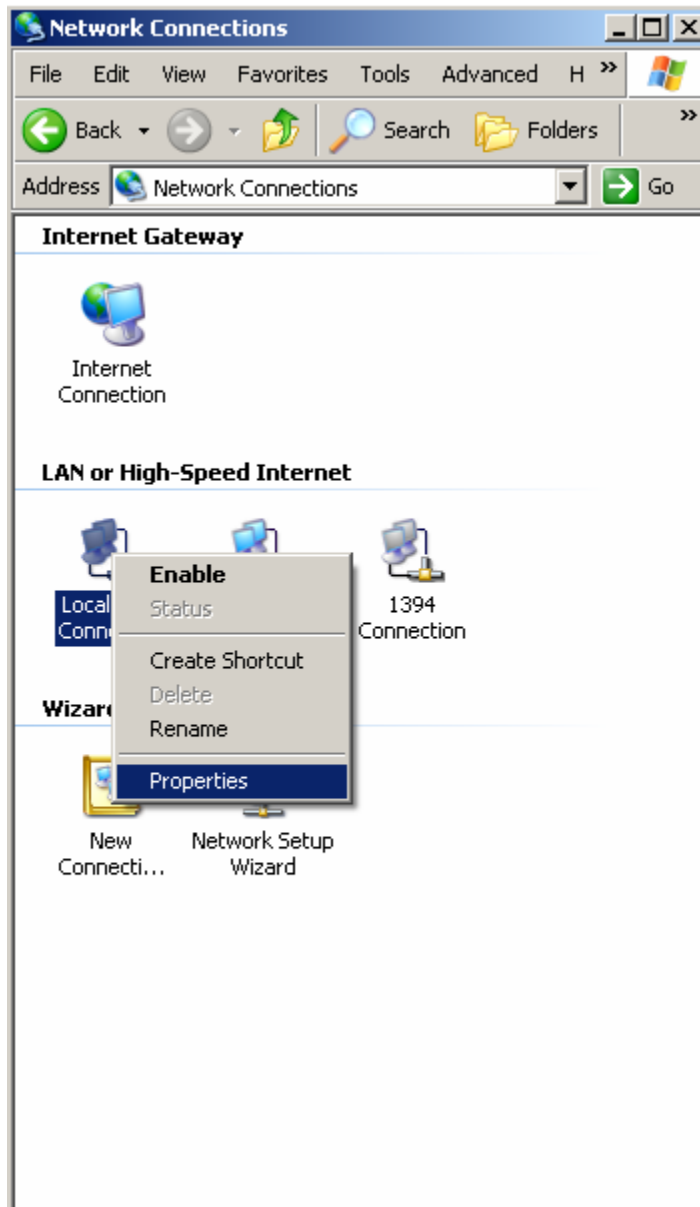
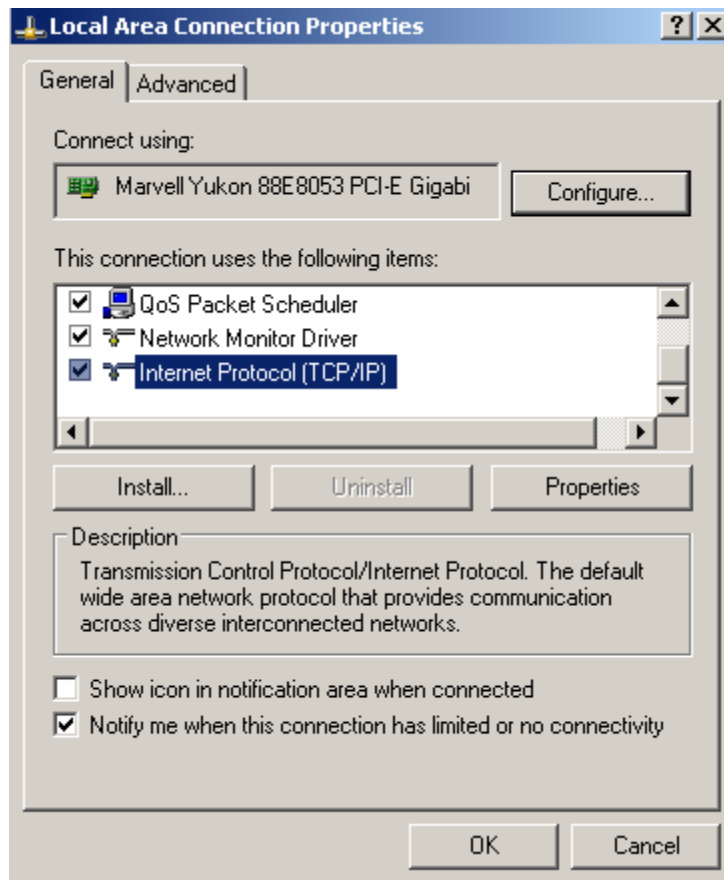


Figure 2.2 Network Connections

Right Click on the Local Area Connection Icon and select Properties





Select Internet Protocol (TCP/IP) and click on Properties button.

Use following IP address:

IP address      192.168.0.101

Subnet Mask    255.255.255.0

Press OK to accept entries.

The screenshot shows the 'Internet Protocol (TCP/IP) Properties' dialog box with the 'General' tab selected. The dialog box has a title bar with a question mark and a close button. Inside, there is a text box explaining that IP settings can be assigned automatically or manually. Two radio buttons are present: 'Obtain an IP address automatically' (unselected) and 'Use the following IP address:' (selected). Below the selected radio button, there are three input fields: 'IP address:' with the value '192 . 168 . 0 . 101', 'Subnet mask:' with the value '255 . 255 . 255 . 0', and 'Default gateway:' with empty fields. Below these, there are two more radio buttons: 'Obtain DNS server address automatically' (unselected) and 'Use the following DNS server addresses:' (selected). Below the selected radio button, there are two input fields: 'Preferred DNS server:' and 'Alternate DNS server:', both with empty fields. At the bottom right of the dialog box, there is an 'Advanced...' button. At the very bottom, there are 'OK' and 'Cancel' buttons.

Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 0 . 101

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

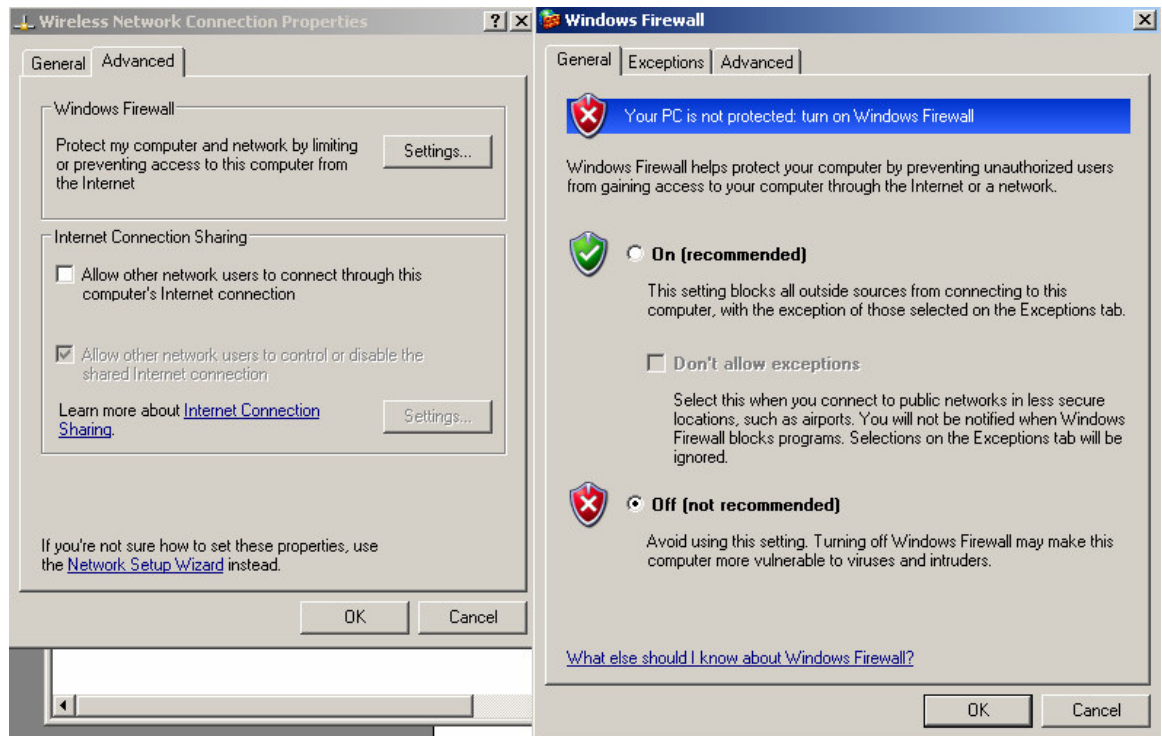
Preferred DNS server: . . .

Alternate DNS server: . . .

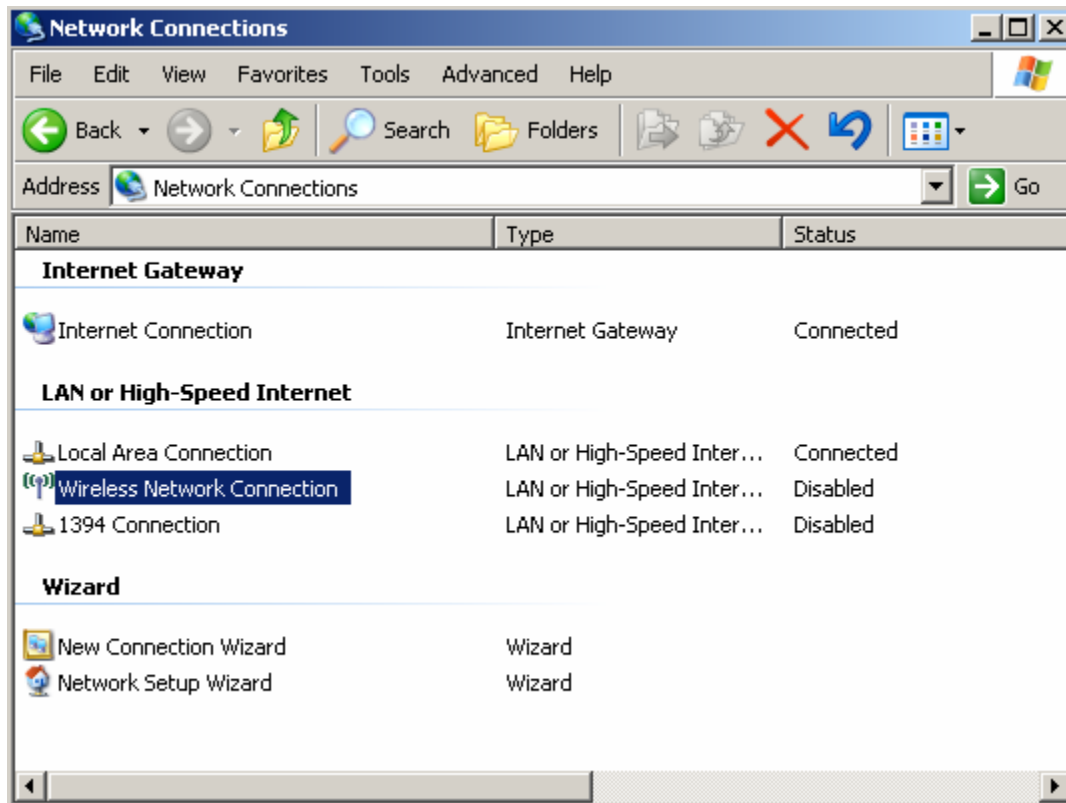
Advanced...

OK Cancel

Select the Advance settings of the Local Area Connections Properties and disable the Windows Firewall



All other Networks should be disabled except for the Local Area Network.

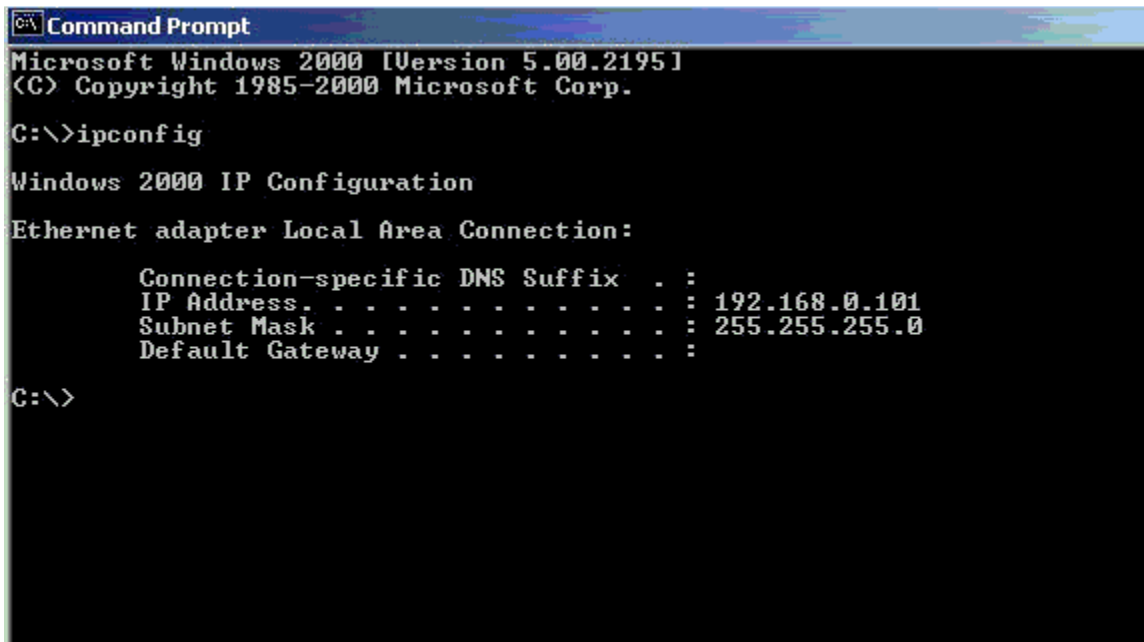


It is sometimes necessary to reboot the computer to have the new address take affect.

Also if the DAQLink II unit was previously communicating with a computer with a different address, then the DAQLink II unit must be reset (power off then on) for the unit to communicate to the new address.

With some of the Windows versions there is an additional Authentication Tab. The Authentication must be disabled to operate with the DAQLink unit.

To verify that the IP address is correct, select “Start”, then “Run”, then type in “CMD”. This starts the command prompt in Windows ( This is similar to the old DOS command prompt). Type the command “ipconfig”. The current IP address 192.168.0.101 should be shown.



```
Command Prompt
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:\>ipconfig

Windows 2000 IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    IP Address. . . . .               : 192.168.0.101
    Subnet Mask . . . . .             : 255.255.255.0
    Default Gateway . . . . .         : 

C:\>
```



## 3 Cable Connections

### 3.1 Bird Dog Cable Connections

- Connect DAQ Link to computer with patch cable provided
- Connect 11-18 VDC supply to DAQ Link power cable (polarity does not matter). The power connects to the 2 pin connector on the DAQlink unit. Make sure voltage to box is at least 11 volts. The power LED will operate with lower voltage but the unit will not perform properly.
- Connect the standard geophone test cable. Connect the 55 pin circular connector to the DAQLink II unit, connect the geophone test clips to the geophone under test.
- The leakage test requires that a 200 kOhm resistor be placed across the “geophone test clips”. The geophone string needs to be connected to the red geophone test clip and the black geophone test clip needs to be connected to the water in the leakage test chamber.

# 4 Configuring The Program

## 4.1 Hardware Configuration

Connect and power up DAQ Link unit. Start the Bird Dog II program by double clicking on GeoTest.exe file in Windows Explorer. Verify the correct DAQ Link unit is enabled by selecting menu **Settings->Device**.

If no unit serial numbers are displayed in the window click Auto Detect. It should find all DAQLink units connected to computer.

Make sure the unit is enabled. A check mark by the serial number shows that the unit is enabled. Just left click the small box next to the serial number to enable it. This feature allows multiple units to be connected through the Ethernet link. All that is needed is an Ethernet hub.

Verify that Reference and Geophone1 are selected in the Channels selection.

Click OK. Settings will be stored in the device memory.

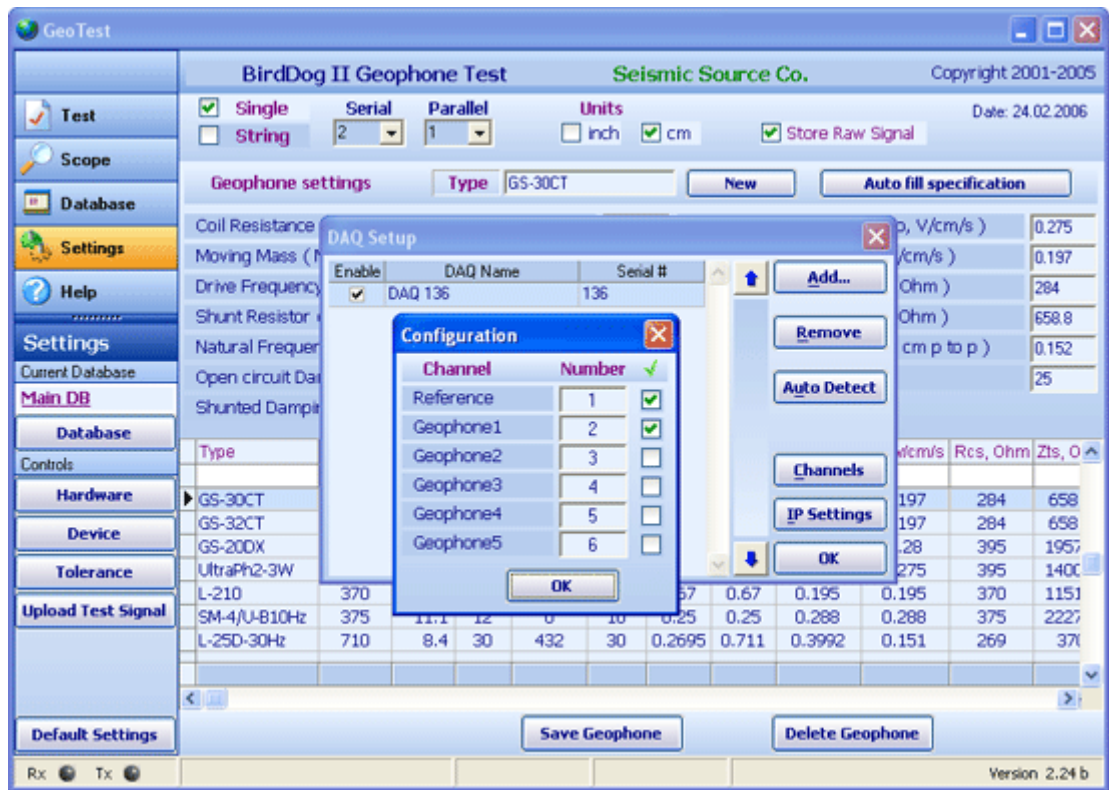


Figure 4.1 Device Configuration

To check that communication with the DAQLink unit is working properly click the menu **Settings->Device**, then IP Settings button. The device information should appear. If the configuration window does not appear, it means that the DAQLink unit selected is not responding.

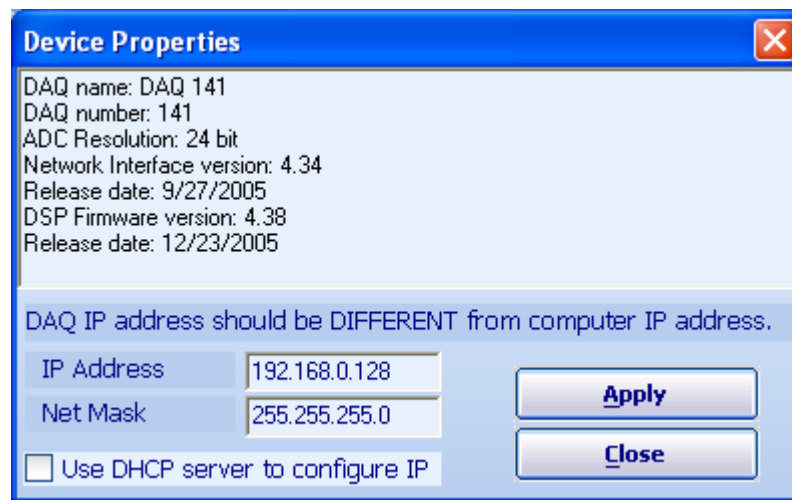


Figure 4.2 Device IP Settings

This is usually caused by improper TCP/IP settings, or Ethernet cable not plugged in properly. The computer or DAQLink unit may need to be reset if the TCP/IP configuration has changed.

The first three numbers in IP Address of DAQLink unit should match your computer IP Address (192.168.0. ). The last number must be different. It should be in the range from 1 to 253. If your computer uses 101 as the last number in its IP Address then you CANNOT use 101 for the DAQLink.

Do not change DAQLink IP Address unless you have some other device connected to network with the same address. Programming wrong IP Address to the DAQLink may cause it to stop communicating with computer.

An additional check of communication can be performed by first removing all DAQ units from the table. Highlight the DAQ unit to be removed then press the Remove button. After all units have been removed, press the Auto Detect button and all units connected to the computer will be added.

Once the unit is setup, there is no reason to return to this menu unless you need to change DAQLink unit or test the communication link.

## 4.2 Calibrating Bird Dog II unit

The Bird Dog II unit allows the end user to calibrate the unit to allow for tolerance of the internal components in the unit. First measure the resistance of the geophone under test with an accurate digital Ohm meter, then perform a resistance test with the GeoTest program. If the values are within 3% then no adjustment should be made. (Most Digital Ohm meters are not accurate to over 3 %). If you feel the Geo Test Program is reporting too high or too low resistance, then the Calibration Resistor (R25) can be adjusted to compensate for the inaccuracy. Go to the Hardware Setup menu in the GeoTest program. Select **Settings → Hardware**

Hardware settings		Date: 2/27/2006
Calibration Resistor R25 ( Typical 612 Ohm )	612	
R26 ( Typical 10,000 Ohm )	10000	
Leakage Fixed Resistor ( Typical 200,000 Ohm )	200000	
Distortion Driving Velocity ( Typical 1.8 cm/sec )	1.78	
Polarity Trigger Level ( Volts, 0 - Auto )	0	
Drive Low Drive Z ( % of normal Drive )	20	
Pulse Drive ( Typical 70 )	70	
Distortion Correction Factor ( Computed )		
Voice ( Requires Tap, Plus, Minus.wav )	<input type="checkbox"/>	

OK Cancel

Figure 4.3 Hardware Setup

The Hardware setup allows fine-tuning of the Bird Dog II test results. The internal constant current source uses an internal (R25) 612 ohm resistor. To check if the entry for the internal resistor needs calibration, test the resistance of a known resistor. Adjust the entry for R25 to calibrate the resistor measurement to be exact.

### 4.3 Lock Feature

There is also a “lock” feature in the program. This allows the technician to “lock out” the critical entries of the program for unskilled operators.

Just click the “lock” button in the setting menus to “lock” the menus.

To “Unlock” the menus, enter the password “ssc”



## 5 Program Operation

The main menu of the program is located at the left side of the program window. It allows you to navigate between various operation modes. They are Test Mode, Scope Mode, Database Mode and Settings Mode. There is an additional menu in the left bottom corner. It corresponds to current operation mode.

### 5.1 Settings



#### 5.1.1 Database Menu



The **Settings -> Database Tools** menu allows the user to Create, Rename, Empty, or Delete the database. Bird Dog II can use different databases to store acquired data. The projects are like folders used to sort and store different data. The program remembers last project and loads it automatically on startup.

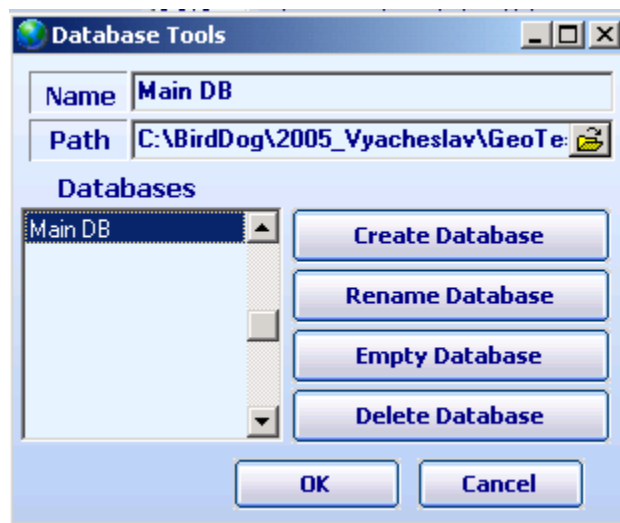
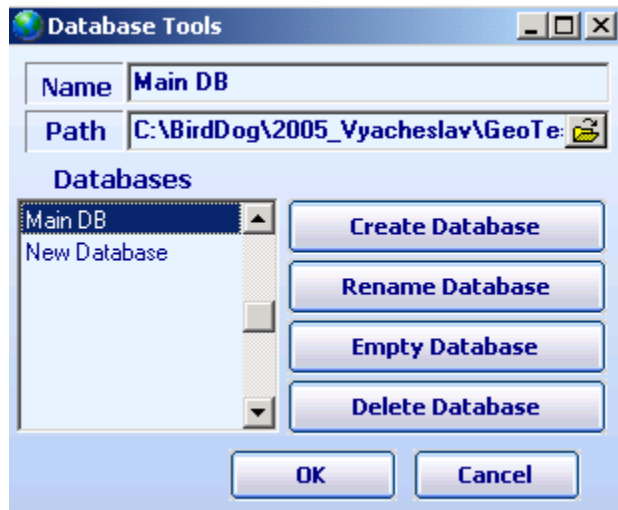


Figure 5.1 File Menu

To Create new Database, first enter new name in the name field, and then press the "Create database" button.

All of the different databases will be shown in the database list.



The above example shows two databases; Main DB, and New Database. Click the database to be used, and the program will switch to that database.

### 5.1.2 Hardware Setup



The Hardware Setup menu is accessed using the menu **Settings -> Hardware**. The Hardware setup allows fine tuning of the Bird Dog II test results. The internal constant current source uses an internal (R25) 612 ohm resistor. To check if the entry for the internal resistor needs calibration, test the resistance of a known resistor. The 612 ohm resistor can be modified to calibrate the resistor measurement to be exact.

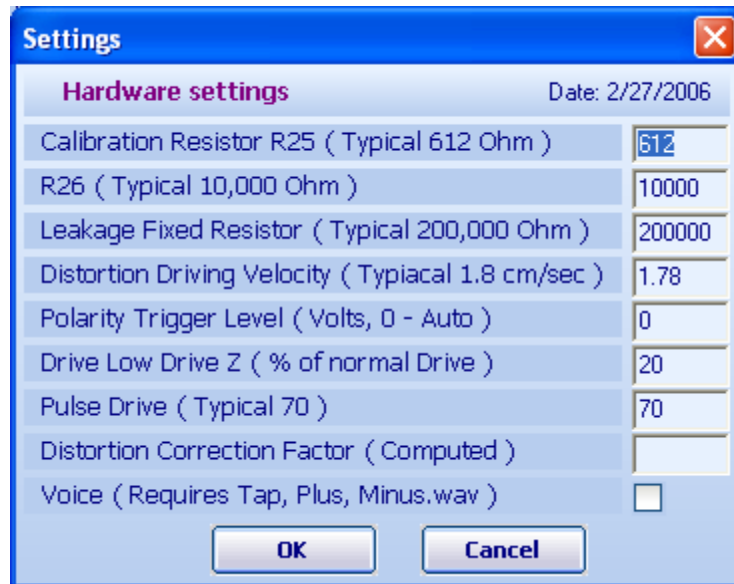


Figure 5.2 Hardware Setup

The Leakage test recommends using a 200 kOhm resistor. This resistor needs to be measured accurately for accurate Leakage measurements. Enter the exact value used for the parallel resistor in the leakage tests.

The geophone parameters will change depending on temperature. The Geotest program will automatically adjust the test readings to show what the results would have been at 20 degrees C operation. Enter the temperature of the geophone under test. The results of the test will be modified depending on the temperature entry. The Geotest program uses the temperature entered in the Geophone Specification to compute the temperature offset. Most manufacturers specify the geophone at 20 degrees C. ( OYO/Geospace specify their geophones at 25 degree C).

Most geophones have the distortion specified at 1.8 cm/sec (0.7 in/sec) velocity. Geotest allows this drive level to be changed. Enter the desired drive level for the distortion test. Normal entry is 1.800 cm/sec.

R26 entry works very similar to R25. For normal operation set this entry to 10000.

The polarity test uses either tones or a wave file. The wave file can be used by selecting Voice in this entry.

Drive for Low Drive Z – This entry is used to set the drive level for the Low Drive Impedance Test. Enter the % of normal drive for the low drive Z tests.

For test purposes only the Pulse Drive can be adjusted in this menu.

Distortion Correction Factor (computed) – This is the distortion correction factor computed by the software. When an external source is used to drive the geophone, a correction factor must be applied to the result to obtain the correct distortion reading of the geophone. The computed total distortion from the FFT is multiplied by this “Correction Factor” to compute the actual geophone distortion.



### 5.1.3 Device Setup

#### Device

Device Setup window is used to detect and setup DAQLink units. Please, refer to section 4.1

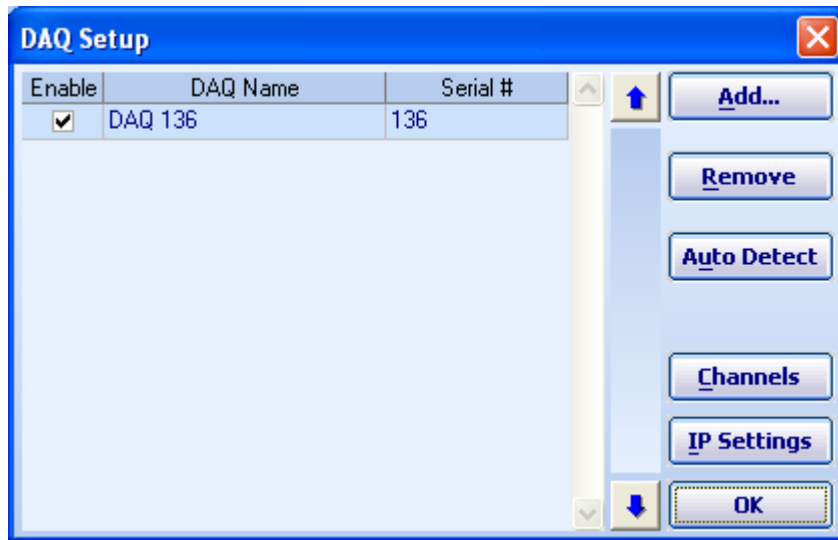


Figure 5.3 Device Setup

### 5.1.4 Tolerance Setup



Menu Tolerance Settings is used to setup the default tolerance settings for geophones. These settings are only used for geophones where tolerances are not entered or equal to 0.

A screenshot of a "Settings" dialog box with a blue title bar and a close button (X) in the top right corner. The dialog contains a section titled "Tolerance settings" in purple. Below this title are ten input fields, each with a label and a value. At the bottom are "OK" and "Cancel" buttons.

Tolerance settings	
Natural Frequency, %	5
Damping, %	5
Sensitivity, %	5
Resistance, %	5
Impedance, %	5
Distortion	0.5
Polarity +1/-1	1
LeakMax, Ohm	1000000

Figure 5.4 Default Tolerance Settings

**Note: Normal Tolerance settings are set with the Geophone parameters**

## 5.1.5 Geophone Selection and Specification

To obtain the correct test results the geophone parameters for the units under test must be entered and selected. All geophones are listed in Geophone Specification table. To select a geophone for the test just click on it with the left mouse button. You can also modify existing geophone specifications or add new geophones to the table.

**BirdDog II Geophone Test** Seismic Source Co. Copyright 2001-2006

☒ Single ☐ String Serial: 3 Parallel: 2 Cable Resistance: Ohm/km Interval: 5.0 m Lead-in: 7.0 m ☒ Store Raw Signal Units: ☐ inch ☒ cm

**Geophone settings** Type: GS-30CT **New** **Auto fill specification**

Coil Resistance (Rc, Ohm)	395	Shunted Impedance (Zts, Ohm)	658.8
Moving Mass (M, Gram)	11.2	Case to Coil Motion (Disp, cm p to p)	0.152
Drive Frequency (Fd, Hz)	12	Temperature (deg C)	25
Shunt Resistor (Enter 0 for none) (Rd, Ohm)	1000	<b>Tolerances settings</b>	
Natural Frequency (Fn, Hz)	10	Frequency Tolerance (+ / -) %	2 2
Open circuit Damping (Bo)	0.316	Damping Tolerance (+ / -) %	2 2
Shunted Damping (Bt)	0.7	Sensitivity Tolerance (+ / -) %	2 2
Open circuit Sensitivity (Go, V/cm/s)	0.275	Resistance Tolerance (+ / -) %	2 2
Shunted Sensitivity (Gs, V/cm/s)	0.197	Impedance Tolerance (+ / -) %	5 5
Shunted Resistance (Rcs, Ohm)	284	Distortion Tolerance %	0.08

Type	Rc, Ohm	M, Gram	Fd, Hz	Rd, Ohm	Fn, Hz	Bo	Bt	Go, V/cm/s	Gs, V/cm/s	Rcs, Ohm	Zts, Ohm	Disp	Temp	FreqTol
GS-30CT	395	11.2	12	1000	10	0.316	0.7	0.275	0.197	284	658.8	0.152	25	
GS-32CT	395	11.2	12	1000	10	0.316	0.7	0.275	0.197	284	658.8	0.152	25	
GS-20DX	395	11	12	0	10	0.3	0.3	0.28	0.28	395	1957.6	0.15	25	

**Save Geophone** **Delete Geophone** **Export Geophone** **Import Geophone**

Rx Tx Version 2.76

Figure 5.6 Geophone Specifications

To add a new Geophone press New button and type in parameters in the top section of the Geophone Settings screen.

The Auto Fill feature can be used to compute impedance, shunted sensitivity and damping. When possible the empty fields will be computed and filled when the Auto Fill button is pressed.

Example:

Enter: Rc, M, Fd, Rd, Fn, Bo, Go, Displacement

AutoFill computes: Bt, Gs, Rcs, Zts

Entries must be blank for auto fill to work. (Use delete key if you want to recalculate entered value)

After all entries in the top portion are correct, press Save Geophone button at the bottom of the screen to save the new geophone and its parameters.

Enter all parameters for a single geophone. The Geotest program will compute the specifications for the string using the single geophone specification.

- Type – This is a text entry that allows the user to identify the parameters when selecting the geophone type. This can be the detailed name or as simple as red ones and blue ones
- Rc-Coil Resistance – Coil Resistance of the geophone.
- M- Moving Mass – Moving Mass of the geophone is used to compute the sensitivity of the geophone
- Fd- Geophone Drive Frequency – determine the frequency that will be used for the distortion and impedance tests
- Rd- Damping Resistor – Enter the value of the damping resistor. A zero should be entered when there is no shunt resistor.
- Fn- Natural Frequency – Enter natural frequency of the geophone.
- Bo – Open circuit Damping – Enter the open circuit damping. This is the damping of the geophone with no damping resistor.
- Bt – Shunted damping – Enter the damping of the geophone with the damping resistor.
- Go – Open circuit Sensitivity – Enter the sensitivity of the geophone with no damping resistor.
- Gs – Shunted Sensitivity – Enter the shunted sensitivity of the geophone. This is the sensitivity of the geophone with the shunt resistor.
- Rcs- Shunted Resistance – Enter the DC resistance of the geophone with the shunt resistor.
- Zts- Impedance – Enter the shunted impedance of the geophone at the Fd ( Drive Frequency).
- Disp – Displacement of the geophone – Enter the peak to peak displacement of the geophone. This entry is used to compute the Step drive level.
- @ Temp – Enter the temperature that the geophone is specified at. Most geophone manufacturers use 20 degrees C to specify the geophone. OYO/Geospace use 25 degrees C to specify their geophones.

### 5.1.6 Units



**Units** – Centimeters- Inches - use this selection to switch between English and metric units.  
Note: Moving Mass is always entered in grams

### 5.1.7 String Selection

To perform test of geophone strings check String checkbox and choose enter number of series and parallel phones.

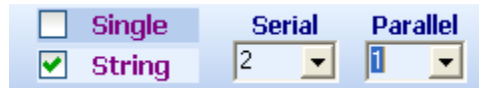
A control panel with a light blue background. On the left, there are two checkboxes: the top one is unchecked and labeled 'Single' in purple; the bottom one is checked with a green checkmark and labeled 'String' in purple. To the right of these checkboxes are two dropdown menus. The first dropdown menu is labeled 'Serial' in blue and currently shows the number '2'. The second dropdown menu is labeled 'Parallel' in blue and currently shows the number '1'.

Figure 5.7 String Selection

You can quickly switch between String or Single geophone in the Main Test Window checking appropriate checkbox

## 5.1.8 String Resistance

There are entries in the program to compensate for the resistance in the wire in a geophone string. The resistance of the cable should be entered as xx ohms per 1000 meters. This value is typically about 120 ohms per 1000 meters.

Also enter the lead in length of the cable used on the string, and the spacing between the geophones. All of the entries should be in meters.

The GeoTest program automatically computes the added resistance and impedance of the caused by the wire in the geophone string

**BirdDog II Geophone Test** Seismic Source Co. Copyright 2001-2006

☒ Single ☐ String Serial: 3 Parallel: 2 Cable Resistance: 120 Ohm/km Interval: 5.0 m Lead-in: 7.0 m ☒ Store Raw Signal Units: ☐ Inch ☒ cm

**Geophone settings** Type: GS-30CT New Auto fill specification

Coil Resistance (Rc, Ohm)	395	Shunted Impedance (Zts, Ohm)	658.8
Moving Mass (M, Gram)	11.2	Case to Coil Motion (Disp, cm p to p)	0.152
Drive Frequency (Fd, Hz)	12	Temperature (deg C)	25
Shunt Resistor (Enter 0 for none) (Rd, Ohm)	1000	<b>Tolerances settings</b>	
Natural Frequency (Fn, Hz)	10	Frequency Tolerance (+ / -) %	2 2
Open circuit Damping (Bo)	0.316	Damping Tolerance (+ / -) %	2 2
Shunted Damping (Bt)	0.7	Sensitivity Tolerance (+ / -) %	2 2
Open circuit Sensitivity (Go, V/cm/s)	0.275	Resistance Tolerance (+ / -) %	2 2
Shunted Sensitivity (Gs, V/cm/s)	0.197	Impedance Tolerance (+ / -) %	5 5
Shunted Resistance (Rcs, Ohm)	284	Distortion Tolerance %	0.08

Type	Rc, Ohm	M, Gram	Fd, Hz	Rd, Ohm	Fn, Hz	Bo	Bt	Go, v/cm/s	Gs, v/cm/s	Rcs, Ohm	Zts, Ohm	Disp	Temp	FreqTol +
GS-30CT	395	11.2	12	1000	10	0.316	0.7	0.275	0.197	284	658.8	0.152	25	
GS-32CT	395	11.2	12	1000	10	0.316	0.7	0.275	0.197	284	658.8	0.152	25	
GS-20DX	395	11	12	0	10	0.3	0.3	0.28	0.28	395	1957.6	0.15	25	

Save Geophone Delete Geophone Export Geophone Import Geophone

Version 2.76

### 5.1.9 Store Raw Signal



You may save some space on your hard drive if only the results of the test are stored to the database.

Uncheck the Store Raw Signal checkbox to store only the results. The program will not save recorded geophone response signal in this case.

Check the Store Raw Signal checkbox to store the signal trace along with the digital test results. The program will save recorded geophone response signal in this case.



## 5.2 Test Mode



The main test window shows which test are currently selected, the geophone type selected, and the results of the previous test or results loaded from database. For the saved record serial number and date of the test will be shown.

In this window you can quickly switch between Single geophone or String. There is also a place to enter current geophone temperature.

The Frequency, Damping, Sensitivity, Resistance, Impedance, and Distortion test will all be performed as one test. Clicking any of these tests will enable all of them.

The Polarity test is performed separately.

The Leakage test is also performed separately and a special cable configuration must be used.

You can adjust Tolerance settings using menu **Settings->Tolerance** (Refer to section 5.1.4)

**GeoTest** BirdDog II Geophone Test Seismic Source Co. Copyright 2001-2005

Date: 7/29/2006

Geophone Type: GS-20DX Natural frequency: 10 Hz

☒ Single ☐ String Serial: 3 x 2 Temperature: 20

Test	Result	Error	Test	Result	Error	Test	Result	Error	Test		
<input type="checkbox"/> Frequency	9.8 Hz	-2.0%	✓ Pass	<input type="checkbox"/> Damping	28.1%	-6.2%	✗ Fail	<input type="checkbox"/> Sensitivity	0.27	-3.5%	✓ Pass
Tolerance 5 %			Tolerance 5 %			Tolerance 5 %					
<input type="checkbox"/> Resistance	414.3 Ohm	4.9%	✓ Pass	<input type="checkbox"/> Impedance	1894.6 Ohm	-3.2%	✓ Pass	<input type="checkbox"/> Distortion	0.12%		✓ Pass
Tolerance 5 %			Tolerance 5 %			Tolerance 0.5 %					
<input checked="" type="checkbox"/> Polarity	Positive		✓ Pass	<input type="checkbox"/> Leakage				<input type="checkbox"/> Low Drive Z	1914 Ohm	-2.2%	✓ Pass
Tolerance 1000 kOhm			Tolerance 5 %								
Coil Resistance, Ohm		395	Damping, %		0.3	Impedance, Ohm		1957.6			
Moving Mass, Gram		11	Sensitivity, V/cm/s		0.28	Shunt Resistor, Ohm		0			
AC Test Frequency, Hz		12	Resistance, Ohm		395	Calibration Resistor		612			

Rx Tx DAQ 140 - STOP received Version 2.36

Figure 5.8 Test Mode Window

Auto Sequence button enables or disables the auto sequence feature  
 Auto Repeat button enables or disables the auto repeat function

### 5.2.1 Start the Test



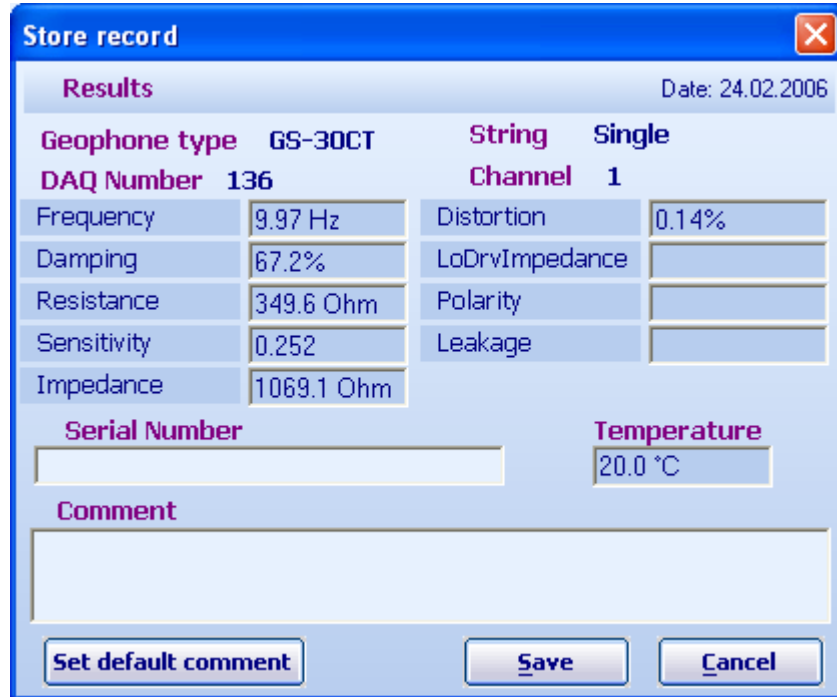
Press New Test button to clear the results stored in memory and shown on the screen. Press Start button ( or “A” key) at the bottom left of the Screen to acquire new test data.

After recording new data the results of the test will be shown on the screen. Depending on the result and tolerance settings the program will mark the results with Pass or Fail. If the tests results are within the user specified limits the tolerance box will be green, if the test result is outside the limits the tolerance box will be red.

## 5.2.2 Storing Data to Database



After acquisition is finished you can save new data to database. To do that click the Save button at the bottom of the main Screen or press “S” key. A window will appear where you can enter a **Serial Number** and a **Comment** for current record. By default this window displays a comment from the previous record.

A dialog box titled "Store record" with a blue border and a close button (X) in the top right corner. The background is light blue. It contains several fields and buttons.

Results		Date: 24.02.2006	
Geophone type	GS-30CT	String	Single
DAQ Number	136	Channel	1
Frequency	9.97 Hz	Distortion	0.14%
Damping	67.2%	LoDrvImpedance	
Resistance	349.6 Ohm	Polarity	
Sensitivity	0.252	Leakage	
Impedance	1069.1 Ohm		

Serial Number:

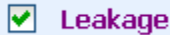
Temperature:

Comment:

Buttons: Set default comment, Save, Cancel

Figure 5.9 Save Results to Database

### 5.2.3 Leakage Test



The Leakage test recommends using a 200 Kohm resistor. This resistor needs to be measured accurately for accurate Leakage measurements. Enter the exact value used for the parallel resistor in the leakage tests.

A resistor, typically 200Kohm, is connected between the positive and negative geophone connectors on the Bird Dog II cable. The positive end of the cable should be connected to one end of the geophone string. The negative end of the cable needs to be connected to a ground point to measure leakage.

Typically, a large water container is used to test leakage. The positive end of the Geophone Test cable should be connected to one end of the geophone string. The negative end of the Geophone Test cable is terminated in the large water container.

The geophone string is submerged in this water container. The Leakage test will measure the resistance between the positive and negative leads of the cable ignoring the 200Kohm fixed resistor. The correct value of the resistor must be entered in the Options-Hardware Setup-Leakage Fixed resistor entry. This test is used to verify the electrical isolation of the geophone string is adequate.

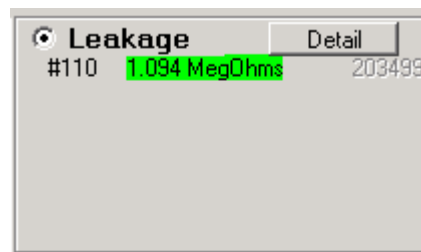
Connect both Positive and Negative side of the Geophone under test to the + connector-  
Ch1 + - Pin A  
Aout – Pin CC  
One side of 200 K resistor

Connect the – connector to a probe which is terminated in water container  
Ch1 – Pin B  
Aout FB – Pin GG  
Other side of 200 K resistor

#### Calibrating Leakage Test

Before testing leakage it is necessary to calibrate the Bird Dog II system for the leakage test. With the 200 K resistor in place and the Geophone string disconnected, select the leakage test and press “Start”.

The leakage test will show a number in “gray”. This is the computed resistance of the 200 K ohm fixed resistor and should be entered in the Hardware Settings.



In the above example “203499” should be entered in the Hardware setup Menu

The screenshot shows a 'Settings' dialog box with a blue title bar and a red close button. The 'Hardware settings' tab is selected, and the date '25.02.2006' is displayed in the top right. The dialog contains a list of hardware parameters, each with a text input field. The 'Leakage Fixed Resistor' field is currently selected and contains the value '203499'. Other fields include 'Calibration Resistor R25' (612), 'R26' (10000), 'Distortion Driving Velocity' (1.78), 'Polarity Trigger Level' (0), 'Drive Low Drive Z' (20), 'Pulse Drive' (73), 'Distortion Correction Factor' (1.729), and a 'Voice' checkbox which is unchecked. 'OK' and 'Cancel' buttons are at the bottom.

Parameter	Value
Calibration Resistor R25 ( Typical 612 Ohm )	612
R26 ( Typical 10,000 Ohm )	10000
Leakage Fixed Resistor ( Typical 200,000 Ohm )	203499
Distortion Driving Velocity ( Typiacal 1.8 cm/sec )	1.78
Polarity Trigger Level ( Volts, 0 - Auto )	0
Drive Low Drive Z ( % of normal Drive )	20
Pulse Drive ( Typical 70 )	73
Distortion Correction Factor ( Computed )	1.729
Voice ( Requires Tap, Plus, Minus.wav )	<input type="checkbox"/>

Enter value found in calibration test for “Leakage Fixed Resistor”

### 5.2.4 Polarity Test



Select Polarity test in the main test window and press Start button. The program will switch to waiting mode. Slightly tap the geophone. If geophone signal exceeds Trigger level then the program will generate a beep and show results on the screen. The beep sound is different for positive or negative polarity. The beeps can be customized by using WAVE files. These files are located in the program folder.

You can change Polarity trigger level and enable WAVE files in the menu **Settings->Hardware**.

### 5.2.5 Hot Keys

Hot Keys are available to speed up the test operation. The following is a list of the keys for main operation:

**Esc** – Stops current test

**F2** – or “**S**”- Saves data – Opens saves data screen – enter serial number and comment before saving data.

**F3**- Clears results

**F5** – or “**A**” -Starts the main test (Frequency, Damping, Sensitivity, Resistance, Impedance, Distortion) for all of the DAQlink units.

**F6**- Starts polarity Test

**F7** – Starts leakage test

**F8** – Starts low drive impedance test

#### Example Production Test

1. Connect new string to be tested
  2. Press F3 – clears previous results
  3. Press F5 – performs Frequency, Damping, Sensitivity, Resistance, Impedance, and Distortion Tests
  4. Press F6 – starts polarity test
  5. Tap each geophone on the string to check polarity
  6. After test is completed Press F2 to save data
  7. Enter serial number or use optional barcode reader
  8. Press Alt S to save data
- Go to Step 1 to test next string

**See Auto Sequence for enabling multiple tests with a single keystroke**

## 5.2.6 Auto Operation Mode

There is also an “Auto Operation” mode. This mode is very useful in testing many strings quickly.

Typically the “Auto Operation” is setup as follows:



To operate in this mode:

First set up the Auto operation as shown above

Select the “Auto operation” in the main menu

Press the “New Test” button

1. Press the “F5” key to start acquisition
2. Wait for polarity test, and tap each geophone on the string. Make sure that each geophone passes the polarity Test.
3. Press “ESC” key to stop acquisition.
4. Press “ALT S” to save the data
5. Install new string
6. Go to step 1



### **5.2.6.1 String Troubleshooting Repeat Mode**

If an error occurs during testing, then it is easy to stop the “Auto Sequence” Mode and retest the string.

To find a bad element in the general test, perform the following:

1. Press “ESC” to stop the “Auto Sequence” Mode
2. Click the “Auto Sequence” button on the main test screen to disable the “Auto Sequence mode
3. Click the “Frequency Test” to enable the “General Test”
4. Press the “Auto Repeat” key to enable the “Repeat” function
5. Turn all of the Geophones on their side.
6. Press Start
7. Turn one geophone upright one at a time
8. Look at results to determine bad geophone

The following screen shows the “Auto Operation” Enabled and the “Repeat” function disabled.

**Geotest - July20**

**BirdDog II Geophone Test** **Seismic Source Co.** Copyright 2001-2006

Date: 7/20/2007

**Geophone Type** GS-30CT ☐ Single ☒ String Serial 3 x Parallel 2 Temperature 20

Natural frequency 10 Hz

Frequency	Result	Error	Test	Damping	Result	Error	Test	Sensitivity	Result	Error	Test
10 Hz	9.94 Hz	-0.6%	✓ Pass	70.0 %	69.8%	-0.2%	✓ Pass	0.591 V/cm/s	0.582	-1.5%	✓ Pass
	Tolerance +2.0 % / -2.0 %			Tolerance +2.0 % / -2.0 %			Tolerance +2.0 % / -2.0 %				

Resistance	Result	Error	Test	Impedance	Result	Error	Test	Distortion	Result	Error	Test
429.6 Ohm	434.7 Ohm	1.2%	✓ Pass	991.8 Ohm	992.0 Ohm	0.0%	✓ Pass		0.09%		✓ Pass
Tolerance +2.0 % / -2.0 %			Tolerance +5.0 % / -5.0 %			Tolerance 0.2 %					

☒ **Polarity** Positive **System Messages** ☐ **Low Drive Z** 991.8 Ohm

**Result** Positive **Test** ✓ Pass **Polarity Test** **Test Completed**

☒ Test Status ☐ Leakage

**Tolerance** +5.0 % / -5.0 %

Device List

DAQ Num	Channel
395	1

Controls

New Test Start Stop Save

Auto Sequence Auto Repeat Export

2:10:03 PM | DAQ 395 - triggered  
2:10:03 PM | DAQ 395 - receiving data  
2:10:03 PM | DAQ 395 - finished acquisition  
2:10:04 PM | DAQ 395 - finished data transmission

## 5.2.7 Test Status Menu –System Messages

There is a Test Status Menu in the Main program. Either the “Leakage Test” or the Test Status Menu can be selected. Selecting Test Status will show the results and status of the testing process. This is very useful in the “Auto Sequence” Mode.

**Geotest - July20**

**BirdDog II Geophone Test** **Seismic Source Co.** Copyright 2001-2006

Date: 7/20/2007

**Geophone Type** GS-30CT ☐ Single ☒ String **Serial** 3 **Parallel** 2 **Temperature** 20

**Frequency** 10 Hz **Damping** 70.0 % **Sensitivity** 0.591 V/cm/s

Result	Error	Test	Result	Error	Test	Result	Error	Test
9.94 Hz	-0.6%	✓ Pass	69.8%	-0.2%	✓ Pass	0.582	-1.5%	✓ Pass
<b>Tolerance</b> +2.0 % / -2.0 %			<b>Tolerance</b> +2.0 % / -2.0 %			<b>Tolerance</b> +2.0 % / -2.0 %		

Result	Error	Test	Result	Error	Test	Result	Error	Test
429.6 Ohm			991.8 Ohm					
434.7 Ohm	1.2%	✓ Pass	992.0 Ohm	0.0%	✓ Pass	0.09%		✓ Pass
<b>Tolerance</b> +2.0 % / -2.0 %			<b>Tolerance</b> +5.0 % / -5.0 %			<b>Tolerance</b> 0.2 %		

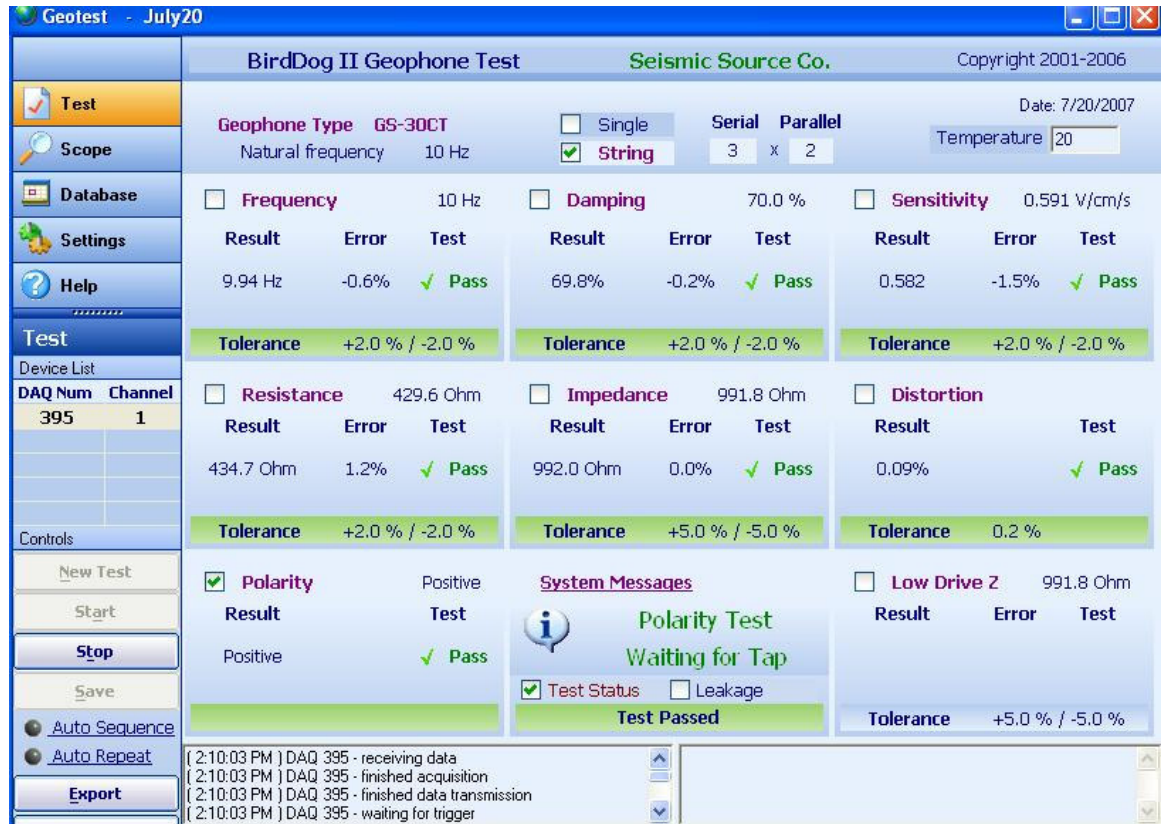
☐ **Polarity** Positive **System Messages** ☐ **Low Drive Z** 991.8 Ohm

**Result** **Test** **General Test** **Test Completed**

☒ **Test Status** ☐ **Leakage** **Test Passed**

( 2:02:08 PM ) DAQ 395 - finished data transmission  
 ( 2:02:10 PM ) DAQ 395 - loaded parameters  
 ( 2:02:10 PM ) DAQ 395 - START received  
 ( 2:02:10 PM ) DAQ 395 - triggered

When the polarity Test is operating the Screen shows the following. This screen shows that the program is waiting on a geophone Tap signal:



### 5.3 Database



GeoTest version 2.68 and newer programs use a new database. The program should update old databases to the new format. The older programs will not be able to read the new database after the conversion process.

The new database includes tolerance settings for each geophone setting. Different Geophones have different manufacturer specifications, and these specifications and tolerances are entered into the database:

Geophone settings		Type	GS-30CT		New	Auto fill specification	
Coil Resistance ( Rc, Ohm )			395		Shunted Impedance ( Zts, Ohm )		658.8
Moving Mass ( M, Gram )			11.2		Case to Coil Motion ( Disp, cm p to p )		0.152
Drive Frequency ( Fd, Hz )			12		Temperature ( deg C )		25
Shunt Resistor ( Enter 0 for none ) ( Rd, Ohm )			1000		<b>Tolerances settings</b>		
Natural Frequency ( Fn, Hz )			10		Frequency Tolerance ( + / - ) %	2	2
Open circuit Damping ( Bo )			0.316		Damping Tolerance ( + / - ) %	2	2
Shunted Damping ( Bt )			0.7		Sensitivity Tolerance ( + / - ) %	2	2
Open circuit Sensitivity ( Go, V/cm/s )			0.275		Resistance Tolerance ( + / - ) %	2	2
Shunted Sensitivity ( Gs, V/cm/s )			0.197		Impedance Tolerance ( + / - ) %	5	5
Shunted Resistance ( Rcs, Ohm )			284		Distortion Tolerance %		0.2

Type	Temp	FreqTol +	FreqTol -	DampTol +	DampTol -	SensTol +	SensTol -	ResTol +	ResTol -
► GS-30CT	25	2	2	2	2	2	2	2	2
GS-32CT	25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
GS-20DX	25	5	5	10	10	10	10	5	5
SG-10	20	2.5	2.5	5	5	2.5	2.5	3.5	3.5
UltraPh2-3W	20	5	5	5	5	5	5	5	5
L-210	20	5	5	5	5	5	5	5	5
SM-4/U-B10Hz	20	5	5	5	5	5	5	2.5	2.5
L-25D-30Hz	20	5	5	5	5	5	5	5	5



Data from the current open project will be shown.

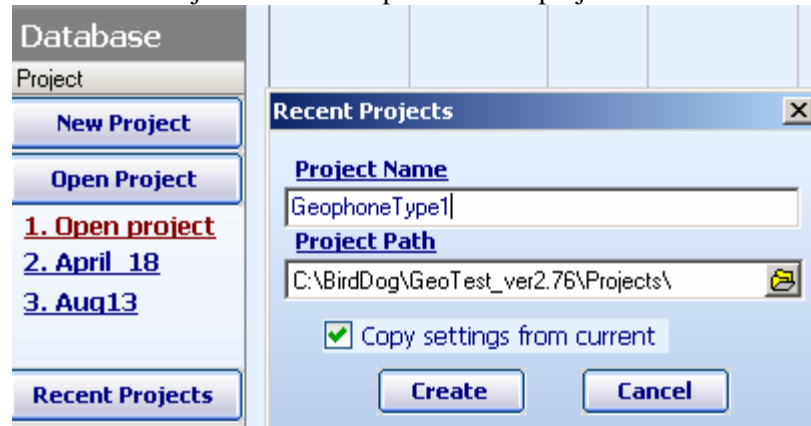
# User's Manual

The following Projects operations can be performed:

- New Project – Select “New Project” to open a new project
- Open Project – Select “Open Project” to open an existing project which has been previously saved to the database
- Recent Projects – A list of “Recent Projects” are shown under the “Open Project” button. These “recent projects” can be quickly opened by clicking the project name.

### 5.3.1 New Project

Press the “New Project” button to open the New project menu



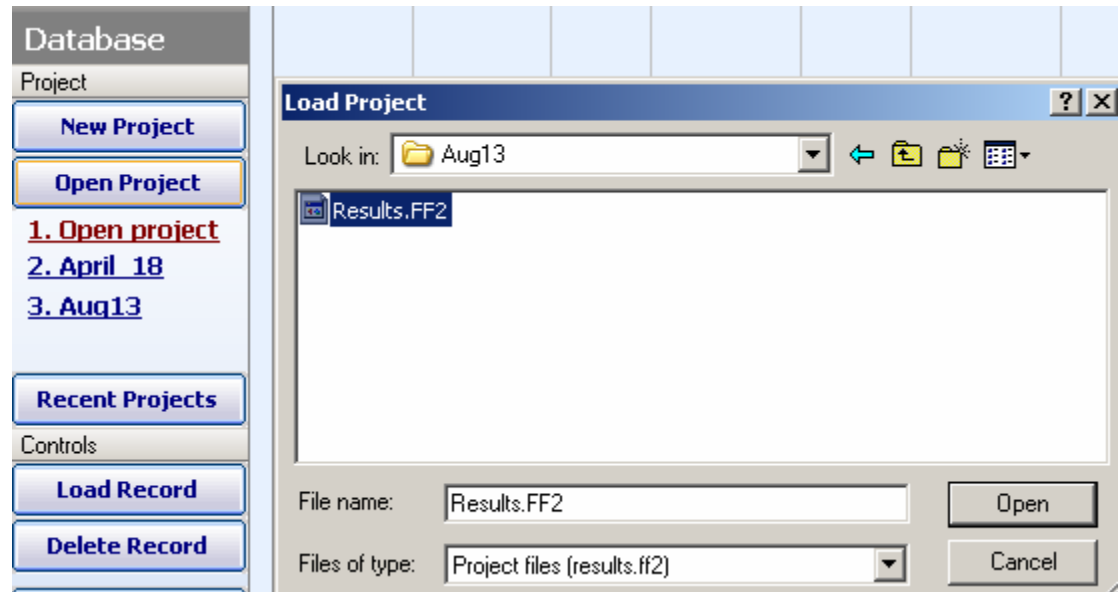
Enter the Name of the new project

Select “copy settings from current” to copy the settings from the current project to the new project.

Uncheck “copy settings from current” to select default settings for new project.

### 5.3.2 Open Project

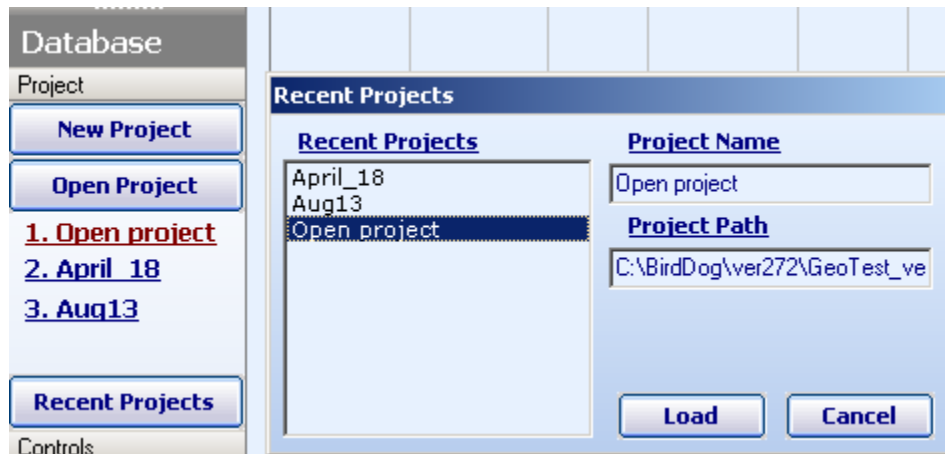
Press the “Open Project” button to open the Recent Project menu



Select the project to open

### 5.3.3 Recent Projects

Press the “Recent Project” button to open the Recent Project menu



The list of recent projects will be shown.

Highlighting a project and clicking the right mouse button allows the selected “Recent Project” to be deleted



### 5.3.4 Main Database Menu

The main database menu allows the user to view and analyze the stored test results. To see a record from database in the main test window press Load Record button.

SerialNum	DateTime	String	Frequency	Damping	Resistance	Sensitivity	Impedance	LoDrvImped	Distortion	Polarity	Leakage	GeoType	Com
1	4/18/2007	Single	9.89	0.259	387.1	0.282	2069.2	0	0.30	1	0	GS-30CT	
2	4/18/2007	Single	9.89	0.261	379.4	0.281	2062.9	0	0.08	1	0	SM-4/U-B10H	
3	4/18/2007	Single	9.89	0.261	380.5	0.281	2063.9	0	0.12	-1	0	SM-4/U-B10H	
4	4/18/2007	Single	9.88	0.261	380.8	0.281	2063.3	0	0.10	1	0	SM-4/U-B10H	
5	4/18/2007	Single	9.89	0.261	380.9	0.281	2063.8	0	0.12	1	0	SM-4/U-B10H	
6	4/18/2007	Single	9.9	0.261	380.6	0.281	2064.4	0	0.11	1	0	SM-4/U-B10H	
7	4/18/2007	Single	9.89	0.261	380.9	0.281	2062.2	0	0.12	1	0	SM-4/U-B10H	
8	4/18/2007	Single	9.89	0.261	380.9	0.281	2062.0	0	0.13	1	0	SM-4/U-B10H	
9	4/18/2007	Single	9.89	0.261	380.8	0.281	2063.9	2060	0.11	1	0	SM-4/U-B10H	
10	4/18/2007	Single	9.89	0.261	380.9	0.281	2063.9	2061	0.11	0	0	SM-4/U-B10H	
11	4/18/2007	Single	9.89	0.261	380.9	0.281	2064.2	2065	0.15	0	0	SM-4/U-B10H	
12	4/18/2007	Single	9.89	0.261	381.0	0.281	2064.8	2060	0.09	0	0	SM-4/U-B10H	
13	4/18/2007	Single	218.06	0.343	4.0	0.025	5.4	5	11.15	0	0	SM-4/U-B10H	
14	4/18/2007	Single	9.89	0.261	381.1	0.281	2063.9	2059	0.11	1	0	SM-4/U-B10H	
15	4/18/2007	Single	9.89	0.261	381.1	0.281	2064.8	2063	0.09	0	0	SM-4/U-B10H	
16	4/18/2007	Single	9.9	0.261	381.2	0.281	2064.4	2061	0.22	1	0	SM-4/U-B10H	
17	4/18/2007	Single	9.9	0.261	381.0	0.281	2066.7	2066	0.14	1	0	SM-4/U-B10H	
18	8/13/2007	Single	9.99	0.699	288.4	0.20	682.2	0	0.06	0	0	GS-30CT	
19	8/13/2007	Single	9.99	0.7	288.5	0.20	682.2	0	0.06	0	0	GS-30CT	
20	8/13/2007	Single	10.0	0.7	288.4	0.201	682.1	0	0.07	0	0	GS-30CT	
21	8/13/2007	Single	10.0	0.7	288.4	0.20	682.0	0	0.06	0	0	GS-30CT	
22	8/13/2007	Single	10.01	0.701	288.4	0.201	682.1	0	0.06	0	0	GS-30CT	
23	8/13/2007	Single	9.99	0.7	288.4	0.20	682.3	0	0.06	0	0	GS-30CT	
24	8/13/2007	Single	10.01	0.7	288.4	0.201	682.3	0	0.07	0	0	GS-30CT	
25	8/13/2007	Single	10.0	0.7	288.5	0.20	682.3	0	0.06	0	0	GS-30CT	
26	8/13/2007	Single	10.0	0.7	288.4	0.20	682.3	0	0.06	0	0	GS-30CT	
27	8/13/2007	Single	10.0	0.701	288.4	0.201	682.3	0	0.07	0	0	GS-30CT	
28	8/13/2007	Single	10.0	0.701	288.5	0.201	682.3	0	0.06	0	0	GS-30CT	
29	8/13/2007	Single	9.99	0.699	288.4	0.20	682.2	0	0.06	0	0	GS-30CT	
30	8/13/2007	Single	10.02	0.701	288.4	0.201	681.9	0	0.06	0	0	GS-30CT	
31	8/13/2007	Single	10.0	0.7	288.4	0.20	681.9	0	0.06	0	0	GS-30CT	
32	8/13/2007	Single	9.99	0.7	288.4	0.20	681.8	0	0.07	0	0	GS-30CT	
33	8/13/2007	Single	10.0	0.701	288.4	0.201	681.9	0	0.07	0	0	GS-30CT	

**Figure 5.10 Database Window**

The database menu allows the user to look at the data in many different formats. To display limited set of records according to some criteria use Filters and Range panels. Filters let you select geophones of a certain type, one of the string configurations or records that passed or failed the test. Using Range panel you can show records that fall between Min and Max value of a certain parameter. To cancel Filter or Range press All Records button.

### 5.3.5 Database Layout Menu

#### Layout Settings

The database layout menu allows the user to select which parameter to view in the database and on the reports. The column titles can also be changed.

A check mark enables the field to be displayed in the database.

**Settings** Date: 24.02.2006

**Layout settings**

Column	Title	✓	Column	Title	✓
DAQNum	DagN	<input type="checkbox"/>	SpecFrequency	SpecFreq	<input type="checkbox"/>
ChanNum	ChN	<input type="checkbox"/>	SpecDamping	SpecDamp	<input type="checkbox"/>
SerialNum	SerialN	<input checked="" type="checkbox"/>	SpecSensitivity	SpecSens	<input type="checkbox"/>
DateTime	DateTime	<input checked="" type="checkbox"/>	SpecResistance	SpecRes	<input type="checkbox"/>
String	String	<input checked="" type="checkbox"/>	SpecImpedance	SpecImp	<input type="checkbox"/>
Temperature	Temp	<input type="checkbox"/>	CoilResistance	CoilRes	<input type="checkbox"/>
Data	Data	<input checked="" type="checkbox"/>	MovingMass	Mass	<input type="checkbox"/>
Frequency	Freq	<input checked="" type="checkbox"/>	TestFrequency	TestF	<input type="checkbox"/>
Damping	Damp	<input checked="" type="checkbox"/>	ShuntResistor	ShuntR	<input type="checkbox"/>
Resistance	Res	<input checked="" type="checkbox"/>	CalibrationResistor	CalibrR	<input type="checkbox"/>
Sensitivity	Sens	<input checked="" type="checkbox"/>	GeoType	GeoType	<input checked="" type="checkbox"/>
Impedance	Imp	<input checked="" type="checkbox"/>	SpecTemperature	SpecTemp	<input type="checkbox"/>
LoDrvImpedance	LoDrvImp	<input checked="" type="checkbox"/>	Comment	Comment	<input checked="" type="checkbox"/>
Distortion	Dist	<input checked="" type="checkbox"/>			
Polarity	Pol	<input checked="" type="checkbox"/>			
Leakage	Leak	<input type="checkbox"/>			

**Default Settings** **OK** **Cancel**

Figure 5.11 Layout Settings

Using the cursor and the left mouse button, the order of the fields can be selected by tagging and dragging the fields in the main database menu.

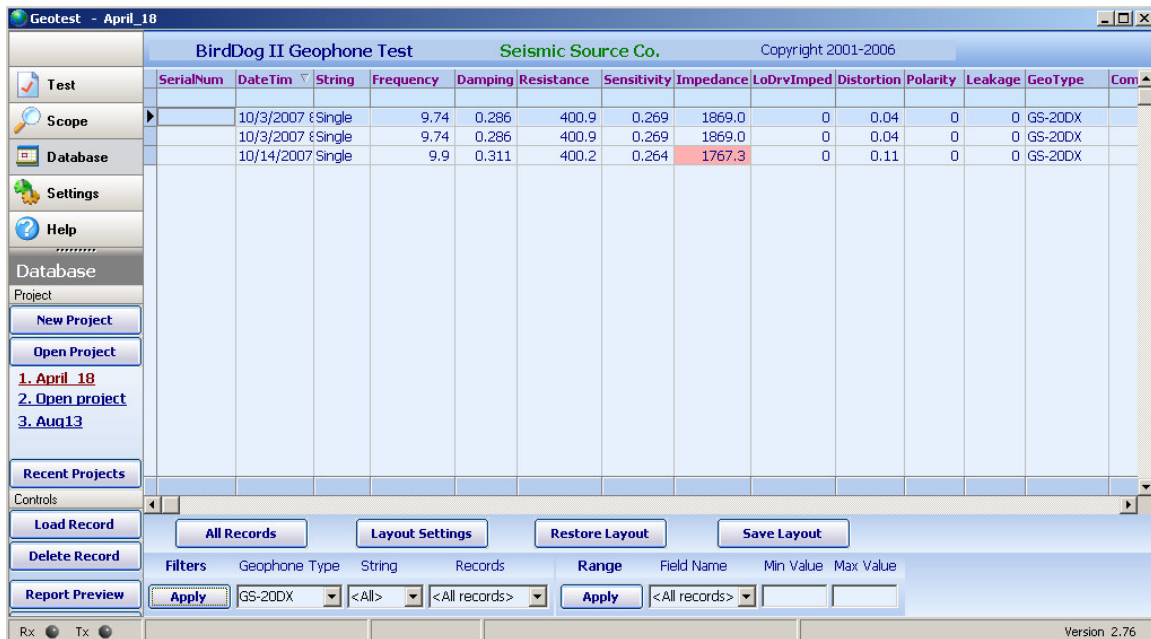


Figure 5.12 Sorting Records

Left clicking the title bar can change the order of the data in the database.

**Example:**

Left clicking time and date will sort the fields by time and date.

Left clicking serial numbers will sort by serial number

The Filters, and Ranges at the bottom of the screen can be changed. The affect on the database can be seen immediately by pressing the Apply buttons.



## 5.4 Scope Mode



In this mode you can view data that were acquired from geophone. Buttons **Start**, **Stop** and **Save** had same functions as and same buttons in the Main Window.



Figure 5.14 Scope Window

The red (Out) trace is the actual geophone signal. The blue (In) trace is the drive signal used to create the geophone response.

Figure shows the test performed by the Geotest program. The Red plot is the actual output of the geophone and the blue plot shows the driving reference signal.

The two step pulses (positive and negative) are used to compute resistance, frequency, sensitivity, and damping.

The sine wave is used to compute impedance and distortion.

### 5.4.1 Setting Zoom Level

Buttons **Axis** , **Full View** and **Reference Off** help to adjust a view of a selected plot. These functions are also available in pop up menu if you click on the plot with right mouse button.



Allows changing of the X and Y axis of the plot.



Zooms out completely to show all of plot.



Reference signal can be turned off

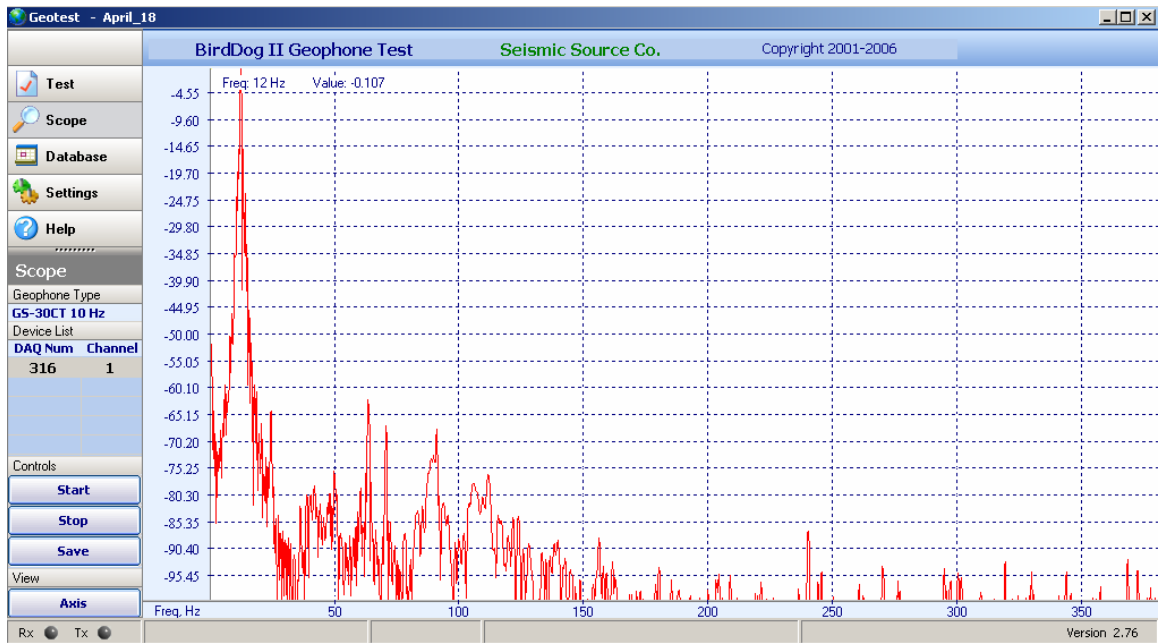
To adjust zoom with the mouse press the left mouse button and make a box to zoom in on an area of the plot.



Figure 5.15 Zooming in with the mouse

## 5.4.2 Distortion Window Setting Zoom Level

The Distortion Button is used to view the sine wave test in the frequency domain



The % Total Distortion measurement compares the Fundamental Energy ( Energy at the Drive Frequency) to the Noise Energy ( All Energy not at the Drive Frequency)

### **5.4.3 Vscope Program**

After setting up the box with the Geotest program, the Vscope program can be used for more detailed analysis.

The Vscope program allows general seismic processing capabilities. The Vscope program can be used for detailed research on the geophone parameters. The following is just a short list of the Vscope program's capabilities:

- Overlays of different geophone tests can be made
- Time Variant Spectral Analysis can be done
- Exporting data to Seg-Y or Ascii file
- Loading special analog drive signal



## 6 Geophone Tests

**Natural Frequency** – The Bird Dog II unit performs a step response to determine the frequency of the geophone. The zero crossings are used to determine the period of the response. The computed damping and the period are then used to determine the natural frequency of the geophone element.

**Damping** – The Bird Dog II unit performs a step response test to determine the damping of the geophone. The peak amplitude of the oscillations occurring after the step response is used to determine the damping of the geophone. The quicker the amplitudes decrease the larger the damping will be.

**Sensitivity** – The Bird Dog II unit performs a step response test to determine the sensitivity of the geophone. During the step the element is raised using a constant current source. The amplitude response after the step, the moving mass of the element, the computed natural frequency, and the computed damping are all used to compute the sensitivity of the geophone element.

**Resistance** – The Bird Dog II unit applies a constant current to the geophone and measures the voltage across the element. The resistance is then computed by dividing the Voltage by the current.

**Impedance** – The Bird Dog II applies an AC signal at the frequency selected in the geophone specification. The impedance is then measured similar to the way the resistance was measured. When different frequencies are selected the impedance will change.

**Distortion** – The Bird Dog II computes the distortion with the same signal used for impedance. A FFT is performed to convert the signal to the frequency domain. The driven frequency (Fundamental) Energy is then compared to the energy of the higher frequencies (noise). The ratio of the Noise/Fundamental is used to compute the % total harmonic distortion.

**Polarity** – The Bird Dog II records the data from the geophone and looks for the first break. A tap on the top of the element producing a positive voltage is considered “Positive” polarity. A negative first break pulse is considered “Negative” polarity. This is consistent with the SEG recommended polarity standard (Downward Motion (Tap on top) = Positive Voltage). The polarity test can be set to “**repeat**”. When “repeat” is selected the test will repeat until it is stopped. Two different audible tones are made by the computer, one for positive polarity and one for negative polarity. The result of the last test will be saved to the database when the data is stored.

**Leakage** – A resistor typically 200Kohm is connected between the positive and negative geophone connectors on the Bird Dog II cable. The positive end of the cable should be connected to one end of the geophone string. The negative end of the cable needs to be connected to a wire that is terminated in a large water container. The geophone string is submerged in this water container. The Leakage test will measure the resistance between the positive and negative leads of the cable ignoring the 200Kohm fixed resistor. The correct value of the resistor must be entered in the Options-Hardware Setup-Leakage Fixed resistor entry. This test is used to verify the electrical isolation of the geophone string is adequate.

## 7 Hardware Setup

### 7.2 Geophone Mounting and Isolation

For proper test results, it is important that the geophone or the geophone string under test be isolated from normal ground movement. This is especially important when working in a trailer or other portable building.

A simple isolation box can be made by filling a box with sand, and placing the box on a piece of foam rubber. Planting the geophones under test in the “sand box” will greatly improve the reliability of the tests.

## 8 Wiring Documentaion

### 8.1 Bird Dog II Connector Wiring

#### 8.1.1 Power LED –

Illuminates when power is applied to box.

Caution if Battery voltage drops below 11 volts, LED will light but DAQlink will not perform properly

#### 8.1.2 Three pin trigger Connector –

A– TB active – A

B– TB return – B

When DAQlink trigger option is set to trigger on Time Break, then this input is used to trigger the box. This input drives an optoisolated input and requires about 3 volts minimum to trigger. Positive Voltage should be applied to pin A, and negative voltage to pin B. Maximum voltage should be less than 60 volts.

NOT USED WITH GeoTest Software

#### 8.1.3 Power – 2 pin MS to X9 connector

A - +battery – A

B – negative battery - B

The DAQlink unit has a bridge rectifier built into the power circuit, so the unit will power with either polarity on the battery connection. There are two internal fuses on the board to prevent damage to the unit. However, we still recommend using an external fast blow fuse of 2 amps.

The unit can be powered from any DC source supplying a minimum of 11 VDC to a maximum of 37 VDC.

#### 8.1.4 Ethernet – 10 base T

Standard Patch cable to Computer

## 8.1.5 PT 22-55 connector

### PT 22-55 connector

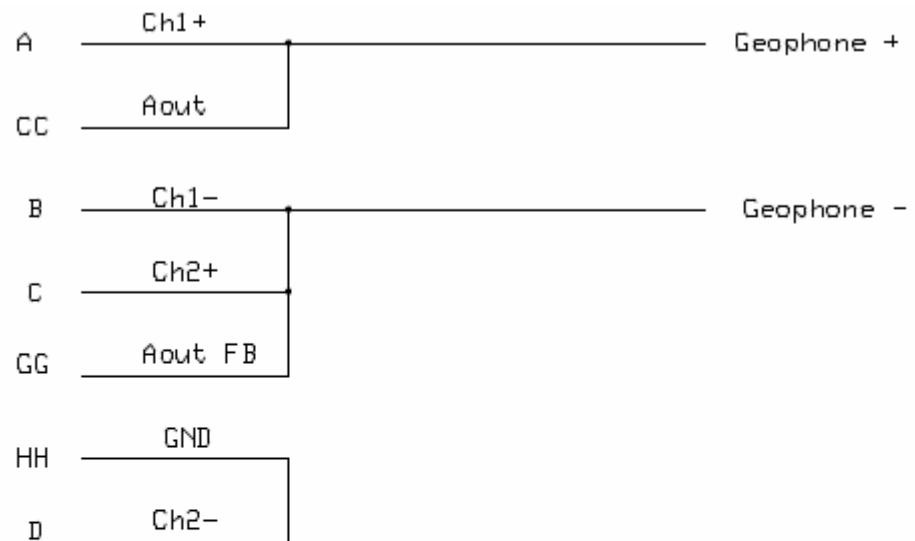
A- Ch 1 pos	v- Ch 22 pos
B- Ch 1 neg	w- Ch 22 neg
C- Ch 2 pos	x- Ch 23 pos
D- Ch 2 neg	y- Ch 23 neg
E- Ch 3 pos	z- Ch 24 pos
F- Ch 3 neg	AA- Ch 24 neg
G- Ch 4 pos	
H- Ch 4 neg	<b>D/A wiring</b>
J- Ch 5 pos	CC – Aout
K- Ch 5 neg	GG – Aout FB
L- Ch 6 pos	HH - GND
M- Ch 6 neg	
N- Ch 7 pos	
P- Ch 7 neg	DD – TB (A)
R- Ch 8 pos	EE – TB (R)
S- 6 – Ch 8 neg	
T- 7 – Ch 9 pos	
U- 8 – Ch 9 neg	FF - + 24 volts
V- 9 – Ch 10 pos	
W- 10 – Ch 10 neg	
X- 11 – Ch 11 pos	
Y- 12 – Ch 11 neg	
Z- 13 – Ch 12 pos	
a - Ch 12 neg	
b- Ch 13 pos	
c- Ch 13 neg	
d- Ch 14 pos	
e – Ch 14 neg	
f- Ch 15 pos	
g- Ch 15 neg	
h – Ch 16 pos	
i – Ch 16 neg	
j – Ch 17 pos	
k – Ch 17 neg	
m – Ch 18 pos	
n – Ch 18 neg	
p – Ch 19 pos	
q – Ch 19 neg	
r – Ch 20 pos	
s – Ch 20 neg	
t – Ch 21 pos	
u – Ch 21 neg	

## 8.2 Bird Dog II Geophone Test Cable –Version 2

Geophone Plus -  
(Ch1 +) - Pin A  
Aout – Pin CC

Geophone Minus  
(Ch1-) – Pin B  
Aout FB – Pin GG  
Ch2 + - Pin C

Ground  
GND – HH  
(Ch2 -) – D



PT22-55 S

**Bird Dog II**

### 8.3 Bird Dog II Geophone Leakage Cable

A resistor typically 200Kohm is connected between the positive and negative geophone connectors on the Bird Dog II cable. The positive end of the cable should be connected to one end of the geophone string. The negative end of the cable needs to be connected to a wire that is terminated in a large water container. The geophone string is submerged in this water container. The Leakage test will measure the resistance between the positive and negative leads of the cable ignoring the 200Kohm fixed resistor. The correct value of the resistor must be entered in the Options-Hardware Setup-Leakage Fixed resistor entry. This test is used to verify the electrical isolation of the geophone string is adequate.

Connect both Positive and Negative side of the Geophone under test to the + connector-

Ch1 + - Pin A

Aout – Pin CC

One side of 200 K resistor

Connect the – connector to a probe which is terminated in water container

Ch1 – Pin B

Aout FB – Pin GG

Other side of 200 K resistor