VibrationMonitor II

Users Manual

Version 2.20

S-723-007

25 Mar 2015

Applies to software builds 11088-09, 11094-23, 11129-07Beta, 11130-14, 12131-15

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DISCLAIMER

The images, pictures, illustrations and photos in this manual are for illustration purposes only and do not necessarily represent the exact product.

CHAPTER 1
INTRODUCTION, *VIBRATIONMONITOR II* DESCRIPTION, SOFTWARE & HARDWARE INSTALLATION

1.1 Introduction

Congratulations on your purchase of a ***VibrationMonitor II*** system and thank you for choosing ***Kinder Scientific*** for your behavioral testing needs.

Figure 1-1. TS1000 VibrationMonitor II Station

TheTS1000 is designed to study the effects of antidepressants in mice. It is similar to the forced swim test, in that it is a learned helplessness model. The system is based on methods first reported in *Psychopharmacology 1985, (85): 367-370*. The basic principle of the system is to suspend the animal from a precision load cell and collect the struggling activity that occurs over the duration of the test. The system is capable of collecting data for up to 4 subjects simultaneously and stores the raw data during collection for post analysis. Typical tests are run for 6 minutes.

During the test, the subjects will exhibit different behavioral escape characteristics including “swimming” or “running” method, a “climbing” method and sometimes a “swinging” method. Each of these methods has different force characteristics. The TS1000 captures the primary force component, the downward force.

Each recorded data file can be reduced to report the following measures:

1. Events – Increments each time the subjects force exceeds a predefined value.
2. Time – The accumulated time during each interval for all events.
3. Force - The average strength or amplitude for each event.

All three measures are provided per a user-defined interval.

1.2 VibrationMonitor II Description

VibrationMonitor II has been designed to put data in your hands as quickly as possible. Default settings, Templates, file storage, and user definable output files have all been designed with flexibility and keystroke reduction in mind. Detailed explanations for these features are provided later, but first let's look at the basic steps of running the system.

Basic Steps:

1. Fill in session information screen.
2. Run the data collection session.
3. Reduce the collected data for export.

Once you have learned how to set up the system, it's that simple.

The manual is divided into two chapters as follows:

Chapter 1 – Introduction, ***VibrationMonitor II*** Description, and Software & Hardware Installation.
Chapter 2 – Getting Started.

VibrationMonitor II records animal responses with a dedicated microprocessor. The collected data is then transmitted via serial communication to the host PC.

1.3 Software Installation

NOTE

You *must* have administrator privileges to install the software.

1.3.1 System Requirements

- Microsoft® Windows™ XP Pro, or Microsoft® Windows™ 7 Pro.
- Dual Core processor minimum
- 8 GB RAM.
- 100GB Hard drive.
- At least one available serial COMM port on the PC.
- 19inch Monitor with 1280x1024 resolution.

NOTE

- Serial to USB adapters are not supported.

- System must have screen savers and Anti-Virus programs disabled during data collection.

- Auto updates and other software applications must not be run during data collection.

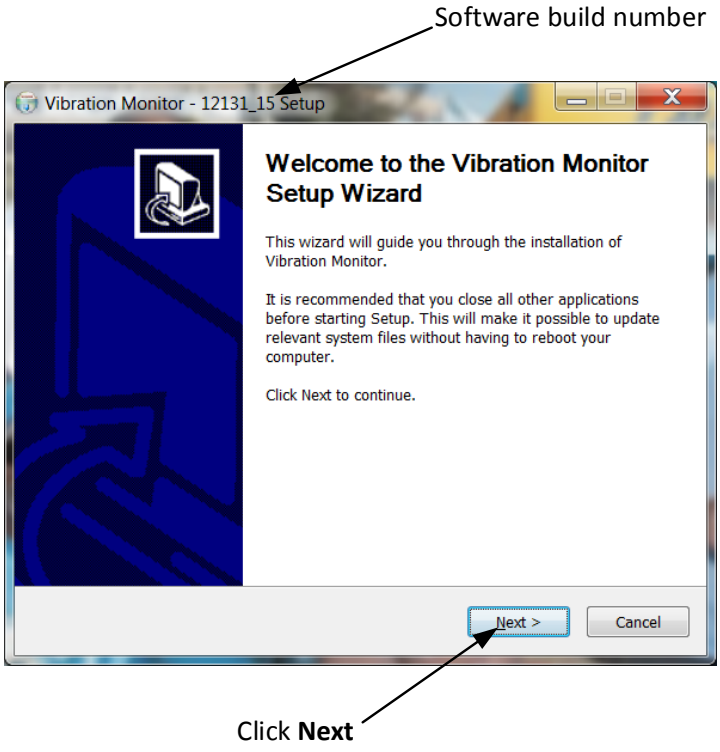
- System power saving settings must be set to ensure there is no interruption of hard drive during data collection.

1.3.2 Installation Preparation

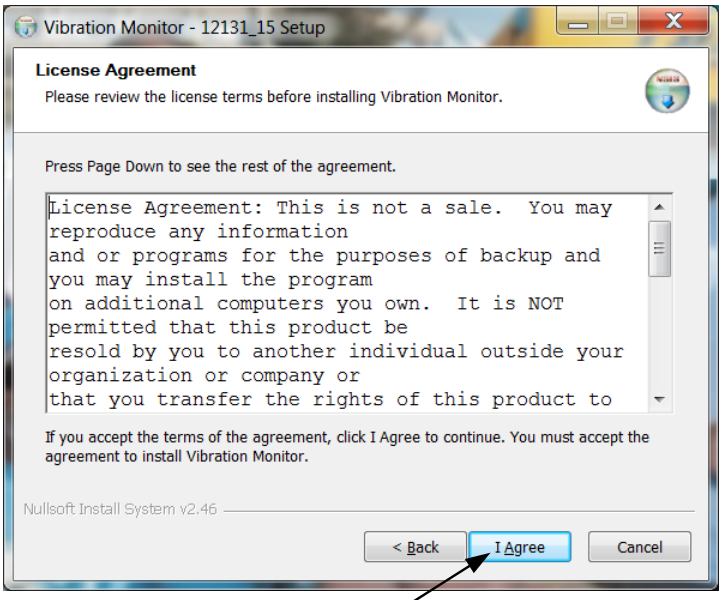
- Close all programs and turn off virus protection software to prevent installation conflicts.
- If you are upgrading from an earlier version of VibrationMonitor II, you must uninstall the earlier version using the **Add/Remove Program** feature in the **Control Panel** for Windows XP Pro or **Programs and Features** in the **Control Panel** for Windows 7 Pro. Existing session files, configuration files, data files, etc., will not be affected by uninstall.

1.3.3 Installation

1. Insert the provided VibrationMonitor II installation CD into the CD-ROM drive. Access the CD-ROM, then click on **VMInstall.exe**. The installation uses an AUTORUN feature and will open the following Screen:

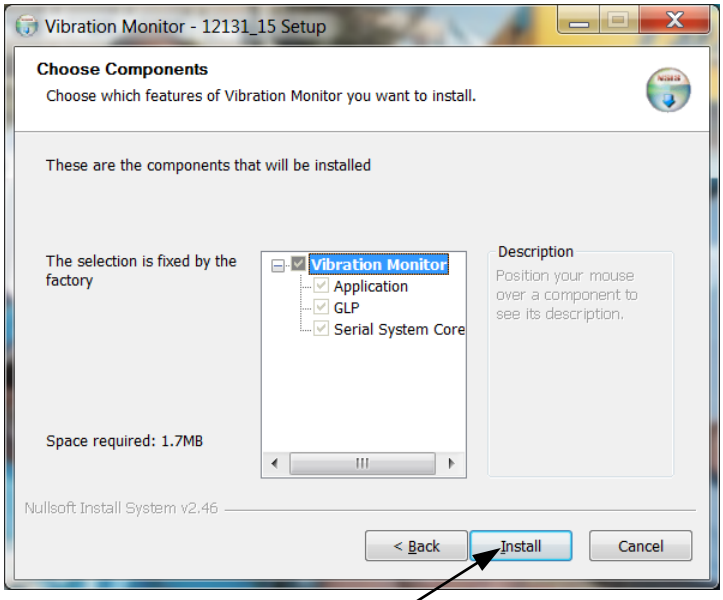


The following screen will appear:

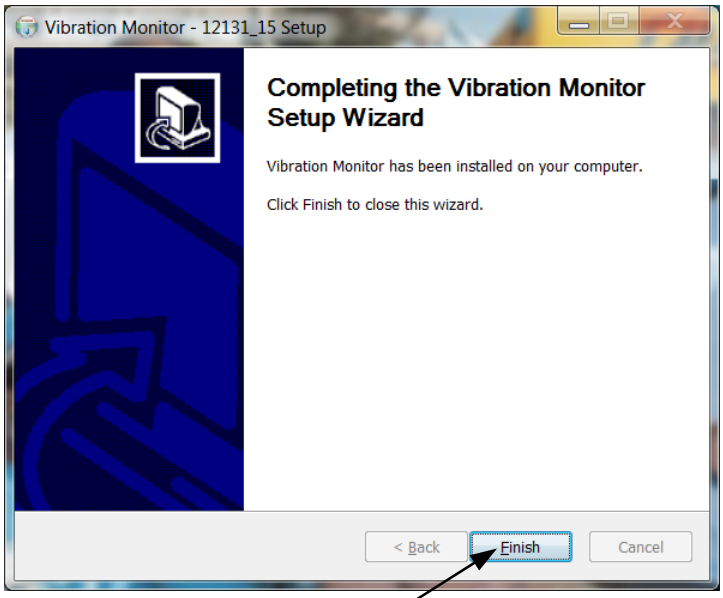


Click **I Agree**

Read through the License Agreement and click on **I Agree.** The following screen will appear:



Click **Install**



The installation is complete. Click **Finish** and the installation screens will close.

1.4 Hardware Assembly and Installation

The following paragraphs describe how to assemble and setup the hardware, and how to connect to the host pc.

1.5 Unpacking the Hardware

Use care when removing the hardware from its shipping container to prevent damage to any protruding connectors, controls, or indicators. Although the components are thoroughly inspected mechanically and electrically before packing for shipment, they must be inspected upon receipt for damage in transit.

1. Make sure each item on the packing list is included with the shipment.
2. Inspect all items for dents, chips and heavy scratches (gouges). Check for broken or bent connectors, controls, and indicators. Photographs of damage may be helpful in substantiating subsequent claims. Hamilton-Kinder insures all shipments for damage.

1.6 Reshipment Procedure

If a component is to be reshipped after receipt, use of the original shipping container and packing materials is recommended.

1.7 Returned Equipment With Warranty or Damage Claims

If a component is damaged in transit you MUST contact the carrier immediately. DO NOT discard the shipping containers as they will be evaluated by the carrier. Your shipment was insured by Kinder Scientific and should be covered for any damage it received in transit.

If the product does not operate as specified when received, notify the carrier and Kinder Scientific customer service immediately by calling 1-858-679-1515. Make sure you get a Service Work Order (SWO) number prior to returning any equipment. Make sure you include the SWO number, your company's name, address, person to contact, and telephone number on the feedback form. A short description of the damage or problem will also be helpful.

1.8 Equipment Description

The features of the ***VibrationMonitor II*** systems are as follows:

A separate ***Control Chassis*** providing the interface between the host computer and the ***VibrationMonitor II*** station. Up to eight stations can be connected to a single ***Control Chassis***.

A ***VibrationMonitor II*** Station with a ***Service Pack*** located on the top of the station. The Service Pack contains most of the station controls and electronics.

Separate power supplies for the ***Control Chassis*** and the ***VibrationMonitor II*** Station.

1.8.1 BSC100 Control Chassis As with all Kinder Scientific systems, the Control Chassis has its own separate embedded microprocessor controller. This architecture provides a stable partition between the data collection effort and the host pc. This greatly enhances the process of real-time data collection within the Windows platform. Communication between the BSC100 Control Chassis' embedded controller and the pc's Windows platform is via an RS232 serial port.

Each **BSC100** Control Chassis is capable of monitoring up to eight stations using a single pc. An example of the ***VibrationMonitor II*** Control Chassis front panel is shown in Figure 1-3.

Figure 1-2. BSC100 Control Chassis

1.8.2 TS1000 Front-Panel Controls and Indicators The TS1000 Front Panel contains the controls and most of the electronics for the ***VibrationMonitor II*** System. Figure 1-3 and Table 1-1 describes the front-panel controls and indicators.

Figure 1-3. TS1000 Front-Panel Controls and Indicators

Table 1-1. TS1000 Front-Panel Controls & Indicators

	NAME	TYPE	FUNCTION
1.	**STATUS**	LED Indicator	Indicates Station Activity when blinking
2.	**AC/DC**	Toggle Switch	Used during Calibration of TS1000 unit.
3.	**ZERO**	Potentiometer	Used to Zero TS1000 output.
4.	**GAIN**	Potentiometer, 10-turn Vernier Dial	Used to Adjust Gain of TS1000 output.
5.	**Test Hook**	Connected to the load cell	Used to hang Calibration weight or Test Subject.
6.	**START**	Pushbutton, Momentary	Used to start a session

Table 1-2. *VibrationMonitor II* Specifications

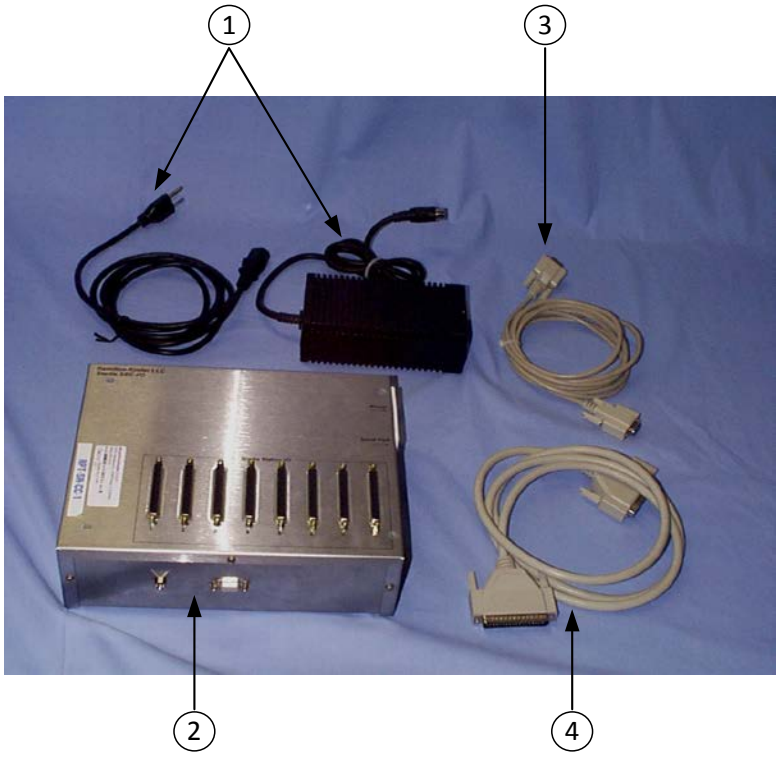
Electrical	
Voltage:	+/- 12Vdc, + 5 Vdc From BSC100
Physical	
Depth (Overall):	7.25" (18.42 cm)
Width (Overall):	7.5" (19.05 cm)
Height:(Overall)	12" (30.48 cm)
Weight	5.5 lbs
Maximum number of stations:	8
Computer Interface:	Single RS232 serial port regardless of the number of stations.

1.9 Hardware Assembly & Interconnection

The ***VibrationMonitor II*** system ships complete with all hardware required for assembly. Each ***VibrationMonitor II*** system will have the following hardware:

The TS1000 ***VibrationMonitor II*** station.

1. 1 BSC100 Control Chassis power supply with a power cord
2. 1 BSC100 Control Chassis
3. 1 RS232 DB9 Serial Cable
4. 1 IEEE-1284 DB 25 I/O Cable
5. 1 1oz Hooked Weight (not shown)
6. 1 10g Weight (not shown)



1.9.1 Assembly

1. The ***VibrationMonitor II*** station is shipped completely assembled and only requires interconnection and configuration.

2. Make sure the surface where the ***VibrationMonitor II*** station is placed is clean and free of any debris.

1.9.2 Interconnection

NOTE

Refer to Figure 1-4 while performing the system interconnection.

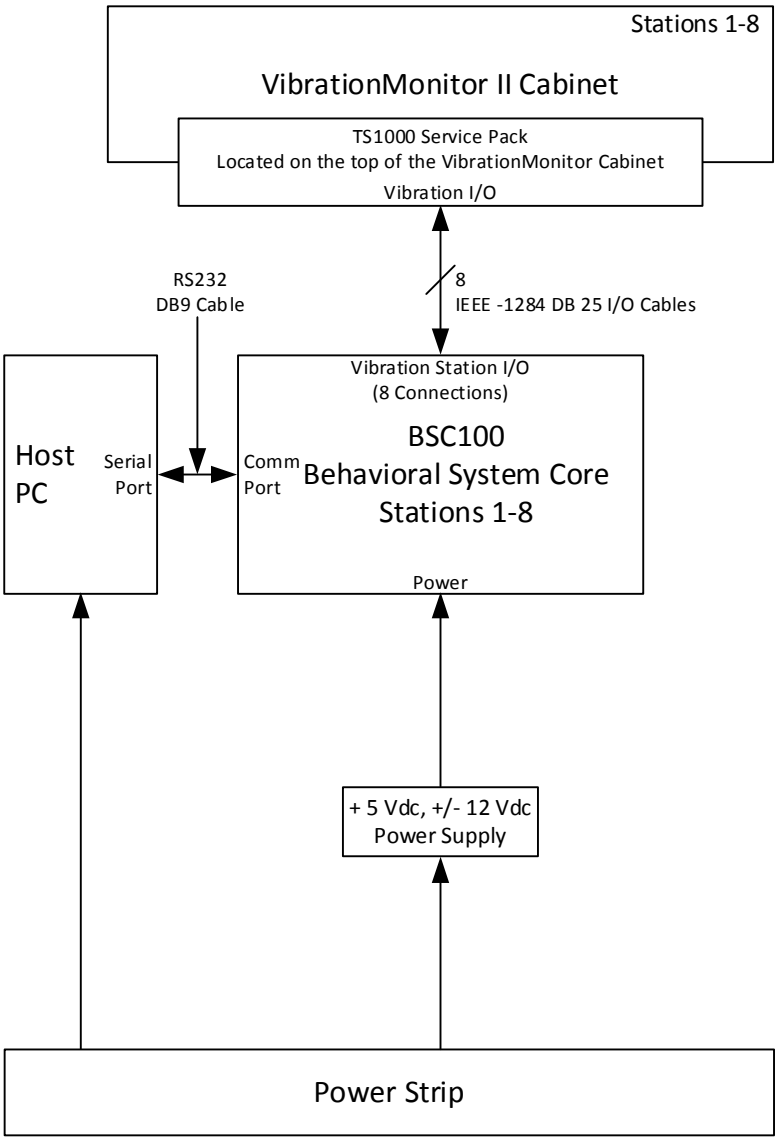


Figure 1-4. VibrationMonitor II Interconnect Diagram

1. First, make sure all power is turned off before making any connections.
2. Connect the serial cable from the host pc to the serial connector located on the BSC100 Control Chassis labeled **Comm Port.**
3. Connect the I/O cable from the BSC100 Control Chassis to the connector located on the rear of the TS1000 Vibration Station, starting with Control Chassis connector number 1.
4. Connect any subsequent I/O cables to their respective Stations.
5. Once all of the cable connections have been made connect the power supply to the BSC100 Control Chassis and to the power source.
6. Connect the host pc to the power strip.
7. Turn on the computer and the power supply (the power supply has its own on/off switch).
8. Once the computer is up and running, enable the ***VibrationMonitor II*** software and then proceed to the next chapter.

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CHAPTER 2
GETTING STARTED

2.1 Introduction

The first thing you will see once the VibrationMonitor program is enabled is a screen similar to Figure 2-1.

Figure 2-1. VibrationMonitor II Opening Screen.

2.1.1 Setting the Comm Port You must select a Comm port in order for the software to communicate with the hardware you just installed. Setting the Comm Port is accomplished using the **Setup** pull-down menu. Click on **Setup** then **System Core Link**. Select **Comm 1** and Click **OK**. This is shown in Figure 2-2.

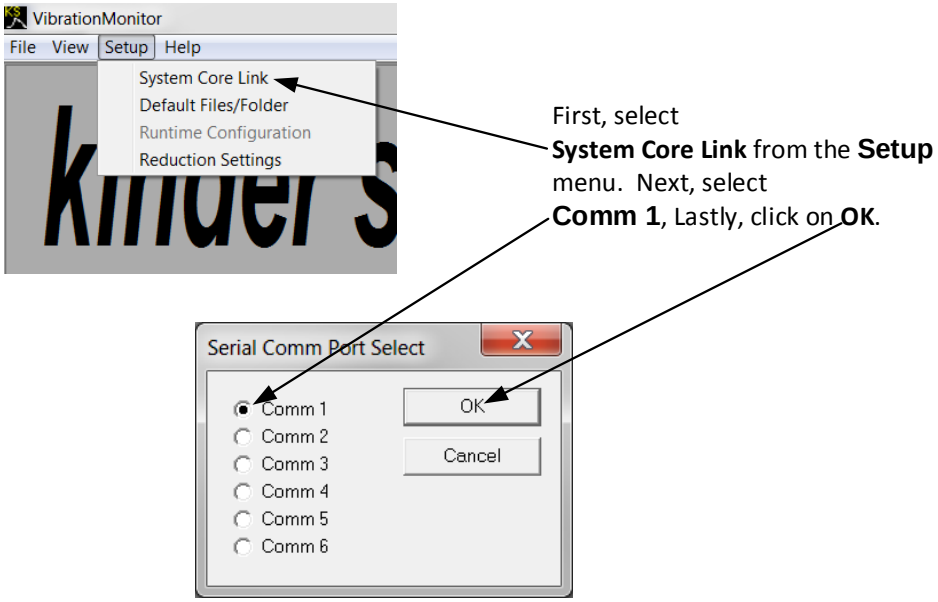

Figure 2-2. Selecting the Comm Port

2.1.2 Checking Communications Use the following procedure to make sure the software is communicating with the hardware.

1. Select the **View** menu, then click on **Diagnostic**. If there is a communications failure, a screen similar to Figure 2-3 will appear. If there is no failure, a screen similar to Figure 2-4 will appear.

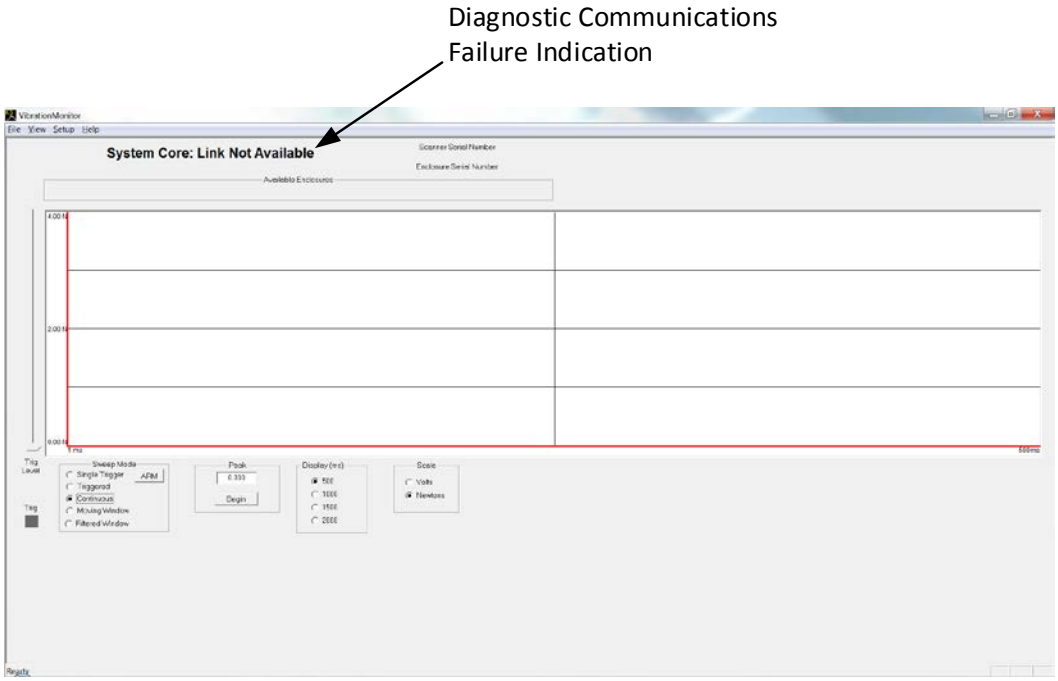

Figure 2-3. Diagnostic Communications Failure Screen

What this screen indicates is a failed attempt to communicate with the BSC100. If you get this screen, check the following:

1. Make sure the RS232 cable that connects the PC to the BSC100 Chassis is properly connected.
2. Make sure the BSC100 Chassis power supply is connected and turned on.
3. Make sure the TS1000 is connected to the BSC100 and turned on.
4. If the power strip the power supplies are plugged into has an on/off switch, make sure it's turned on and there is power to the power strip.
5. Make sure a Comm Port is selected (Figure 2-2).

6. A visual indication that the problem is rectified will be a display similar to the one shown in Figure 2-4.

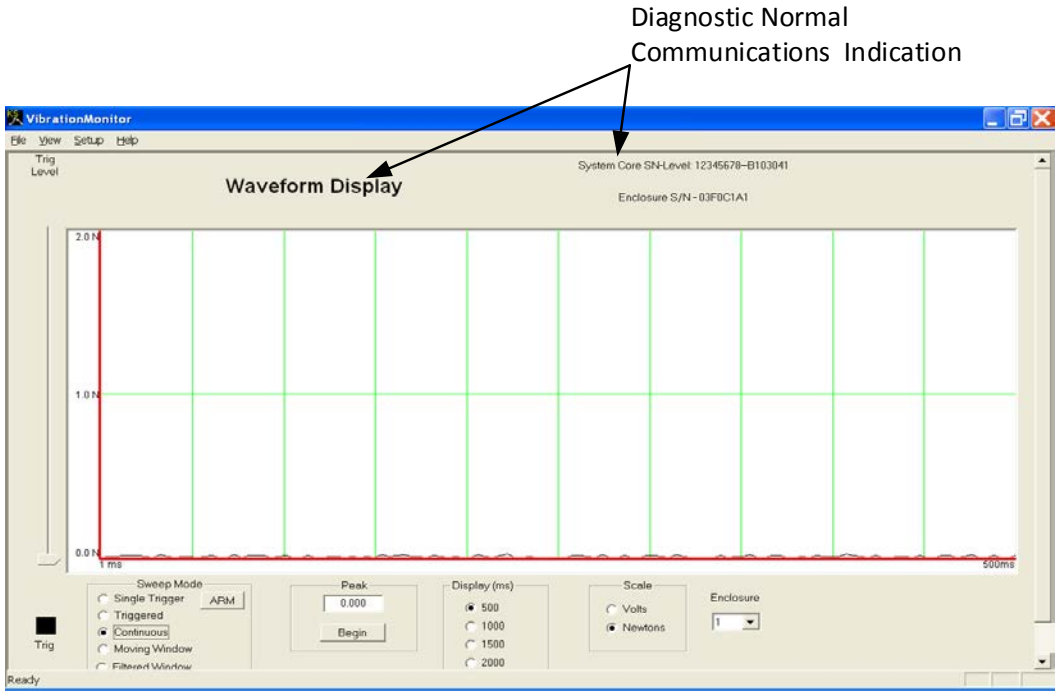

Figure 2-4. Diagnostic Screen Showing Normal Communication

2.1.3 Setting Default Files/Folders You can accept the installation default locations where the system stores the raw data files and the reduced files, or you can change them. To do this, click on **Setup** and then **Default Files/Folder** as shown in Figure 2-5.

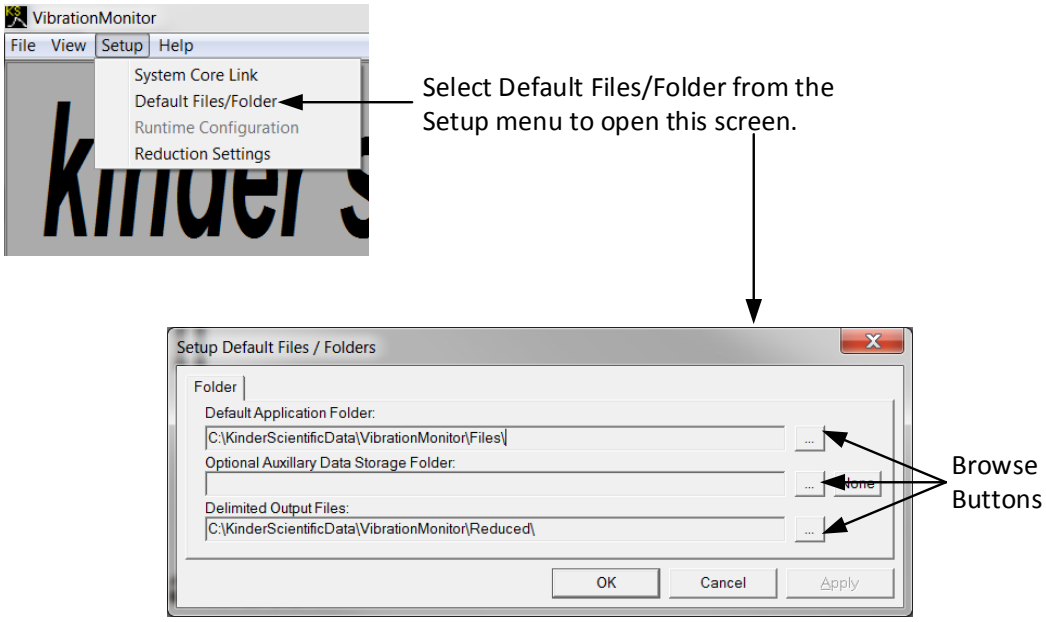

Figure 2-5. Default Files/Folders Screen

The **Default Application Folder** setting determines where the raw data files will be stored and where session files are saved.

The **Optional Auxiliary Data Storage Folder** is used as a redundancy storage site and may be set to any path, including any desired network drives.

The **Delimited Output Files** setting determines where the system will store all reduced files. It can be set to any valid path.

NOTE

These three default file/folderlocation selections *do not* include CD drives.

2.2 Basic Setup

The first step is to set the default settings. From the main screen, click on the **Setup** menu and then select **Reduction Settings**. The **System Parameters** screen will appear as shown in Figure 2-6**.**

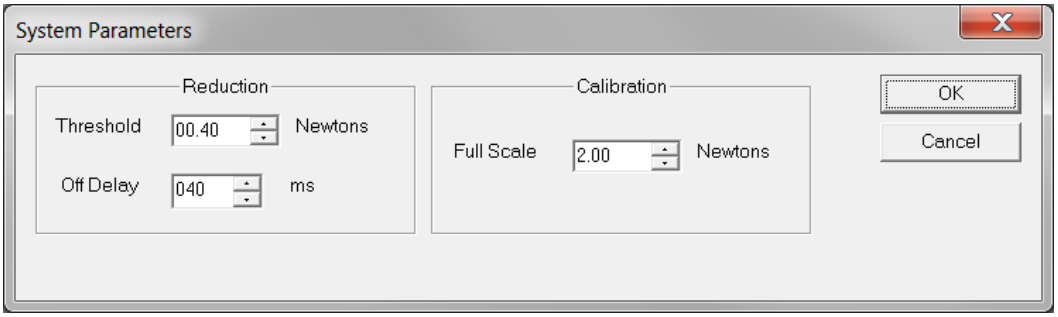

Figure 2-6. System Parameters Screen

These settings are used to determine thresholds used in reducing data. While it is technically possible to change these settings after a session is run, it is however, advisable to set them before you begin. During setup you will switch between the diagnostics screen and the setup screen to determine the **Threshold** *(minimum force in Newtons)* required in order to begin an event, and an **Off Delay** *(minimum time in milliseconds used to determine a non-struggling condition).*

Full scale sensitivity is set from this screen as well. Set this Full Scale to 2.00 Newtons to start.

To reach the diagnostic screen click **OK** or **Cancel**, then click on the **View** menu and select **Diagnostic.** The screen will appear similar to the one shown in Figure 2-7. Click on the **Moving Window** radio button

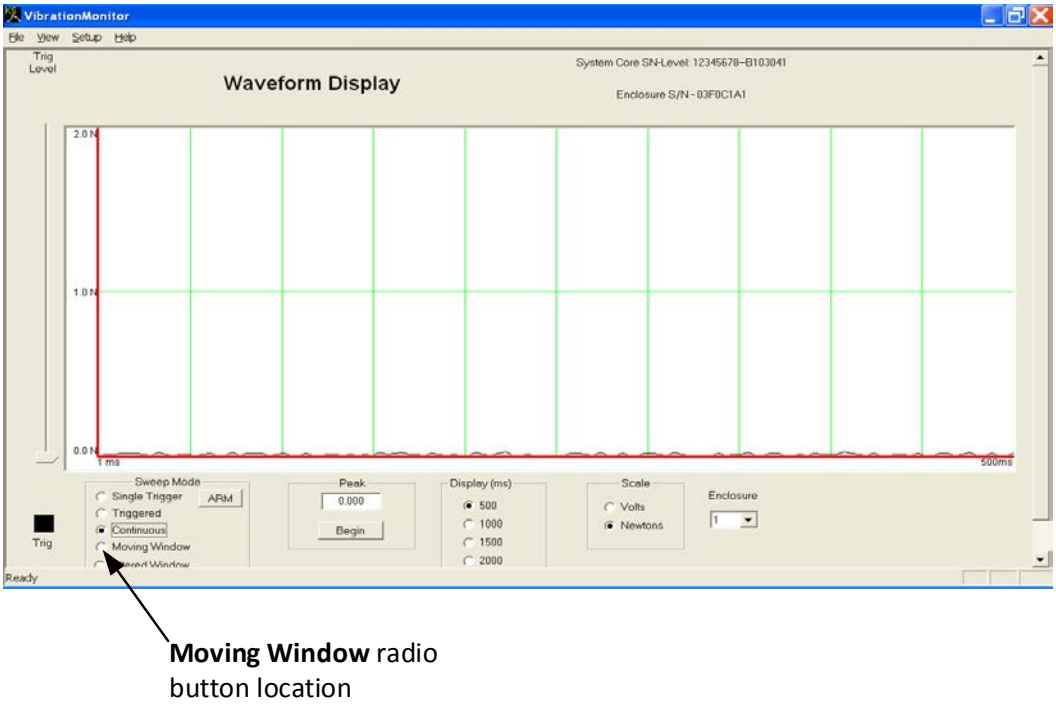

Figure 2-7. Moving Window Radio Button Location

Do not change the **Peak** or **Scale** settings. You will use only the **Moving** or **Filtered Window.** Choose **Display** time in milliseconds and \Scale units to Volts or Newtons.

2.3 Equilibration of the TS1000 Enclosures

Perform the following steps to equilibrate the TS1000 Stations:

NOTE

Since the stations are very sensitive to vibration it is very important to ensure that they are placed on a stable platform.

1. Select the **Diagnostic** mode of the Vibration Monitor Software.
2. Select **View** and **Actual Voltage**, and select the Enclosure number you are adjusting.
3. Place **AC/DC** switch to the **DC** position.

4. Using an adjustment tool or small slotted screwdriver, adjust the **ZERO** control potentiometer for 0.00 V, +/- 0.02 Vdc. System sensitivity to external vibration, including the power supply fan, will cause this zero value to 'bounce'. Adjust as close to zero as possible
5. Place the 1.0 oz. weight (or a weight approximate to the average test subject weight) onto the hook in the ceiling of the Enclosure.
6. Verify Full Scale Calibration setting of 2 Newtons. Adjust the **GAIN** Vernier control to 7.0.
7. Re-adjust the Zero control potentiometer for 0.00 V, +/- 0.02 Vdc
8. Add 10gram weight to the 1oz weight on the Enclosure hook. Adjust the **GAIN** Vernier control for a 1.5 Newton reading on the Diagnostic screen.
9. Remove the weights from the Enclosure hook.
10. Set the **AC/DC** Switch to the **AC** position.
11. Repeat for any additional Enclosures.

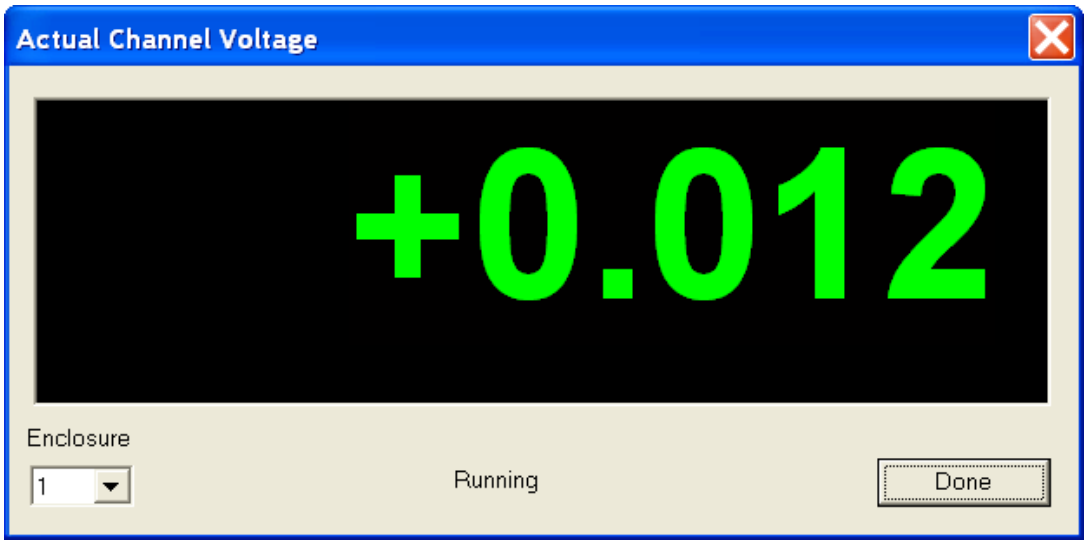

Figure 2-8. Zero Voltage Adjust Example

2.4 Determining Reduction Parameters

1. This is the most important step to retrieving valid data. Suspend the subject from the tail using a piece of scotch tape as shown in Figure 2-9.

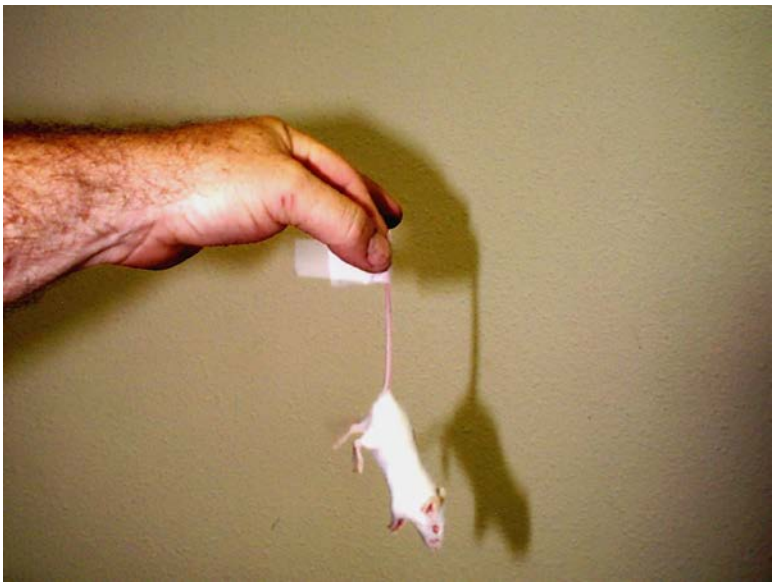

Figure 2-9. Applying Tape to the Tail of the Test Subject

2. Next attach the subject from the load cell by puncturing the tape onto the hook as shown in Figure 2-10.

Figure 2-10. Attaching the Test Subject to the Hook.

3. Next click on the diagnostics. You will see a screen similar to Figure 2-11. Please be particularly careful ***not to pull*** on the load cell, it is a delicate device and can be damaged if too much force is applied to it.

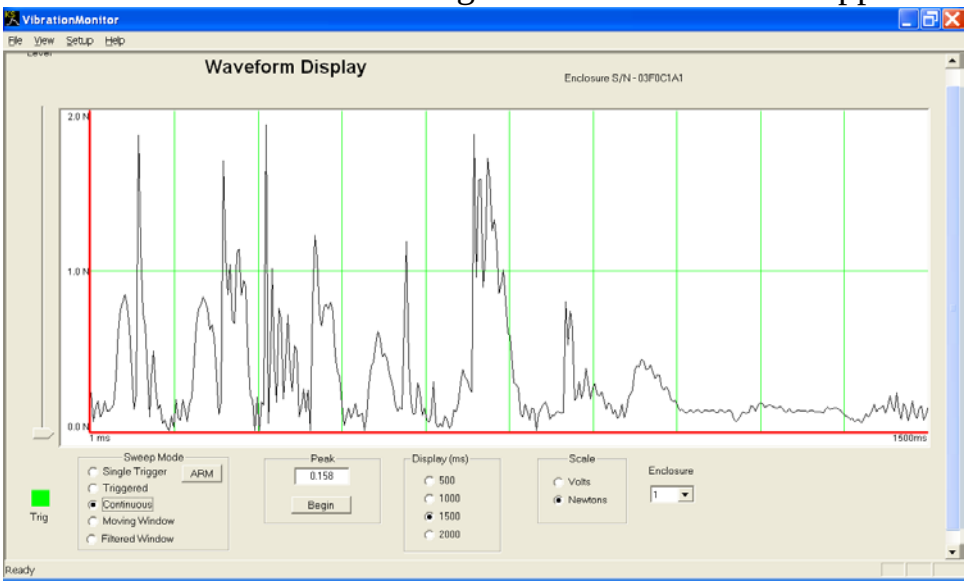

Figure 2-11. Continuous Waveform Display

4. Now change the sweep mode to **Filtered Window**. The display will appear similar to Figure 2-12.

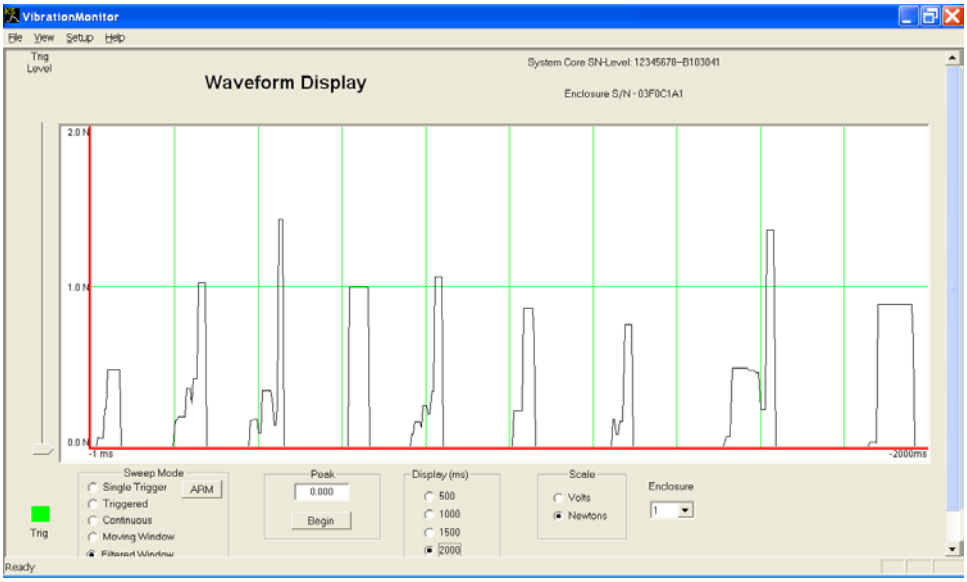

Figure 2-12. Filtered Window Waveform Display

5. As the subject creates force events the software will display each event that has a force higher than the threshold setting. The event will begin on the first force recorded higher than the threshold and will last until the force is less than the threshold for a period equal to **Off Delay**. As you monitor the subject's movements adjust the default settings so that the events are tripping at the desired level. You will need to alternate between the default setting screen and the diagnostic screen to accomplish this task. Once you are satisfied with the default settings record them for future reference.

2.5 Running a Session

Running a session is simple and straightforward. Simply click on **New** from the **File** menu, set the **Duration**, **Start Type** and give the session a file name in the **Description** field. Just before clicking on *Save*, suspend the subject or subjects for testing. Click on save to run the test if you selected **Session Begin** from the **Start Type** group. If you selected **Each Enclosure**, press each Station Start button. If you selected **Enclosure 1**, you only need to press the Start switch on Station 1 to start all stations selected.

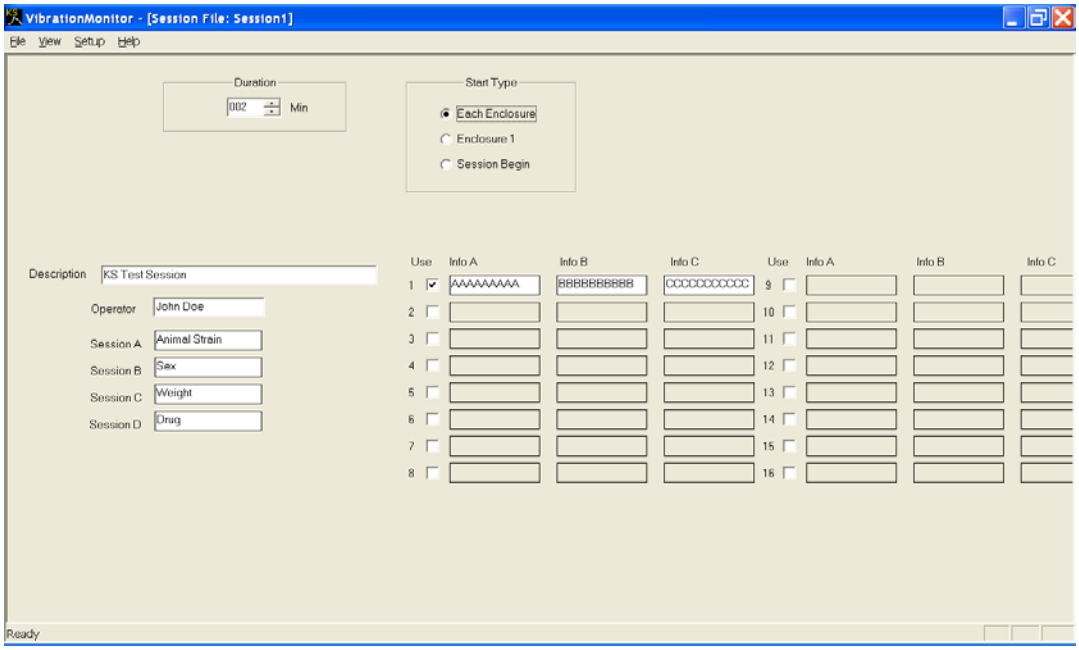

Figure 2-13. Session Screen

Figure 2-14. Session Running Waveform Display

2.6 Reducing Data

Reducing the data is also very simple. To reduce data click on *Reduce*, select the file to reduce, give the output file a unique name (hint: use the file extensions ***.csv*** for automatic Excel format) and click on save.

GLOSSARY

Acclimation

A form of reversible physiological adaptation by which an animal is able to alter its tolerance of environmental factors.

Conditioned Stimulus (CS)

In classical conditioning, a stimulus, which originally does not evoke any response similar to the unconditioned response, but which during conditioning, acquires the property of eliciting this response or a similar one. The original neutral stimulus.

Inter-Trial-Intervals (ITI)

A user-defined time partition used during data analysis. Specifically, an ITI is a user-designated time interval *between* trials.

Output Reduction File

This file is created by funneling any variety of data files into one reduction file. The resulting reduction file will then contain all the requested measures. It is a comma-delimited file especially set up for easy export into spreadsheets or statistical programs.

Paradigm

An example serving as a model or pattern.

Session

A complete data collection sequence for all enclosures listed in a single-session data file. Put simply, the data collected from a single press of the start button of each enclosure selected for that session.

Session File

A binary file containing all the header information entered by the user including duration, session parameters, enclosure information, and the actual data generated during the session.

Session Template

A file containing commonly used header information. The user can create a variety of session template files and store them away for repeated later use. This is a time saving technique to help save the user from repetitive typing of commonly used information. Typically contains duration, session description, session information labels and data, and enclosure information labels and data.

Unconditioned Stimulus (UCS).

In classical conditioning, a stimulus which evokes or elicits a regular and measurable response (the unconditioned response).