

HiGee/LoGee Operating Instructions
Revision 2.03
27-December-2004

Description

The HiGee/LoGee is a battery operated tri-axial acceleration logger housed in an easy-to-mount ABS enclosure.

Features

- Status LED
- PC serial port connection
- Mounting flanges
- Battery access

Status LED

The status LED will blink once per 7 seconds when it has a battery installed. The LED will also illuminate when it is writing data. Just before logging begins, the LED will stay on for approximately 2 seconds, then will be off for 3 seconds. It will flash when the logger writes a log entry to memory.

PC Serial Port Connection

This allows the logger to be connected to the PC via the serial cable (RS-232/DB-9).

Mounting Flanges

Allows the logger to be rigidly mounted if desired.

Battery Access

The battery is accessible by removing the 2 screws on the enclosure, and removing the logger circuit. The battery snaps into the retainer on the backside. Use a CR2450 lithium 3-volt battery. Battery life will be approximately 3 months, depending upon use. **Battery life is shortened when connected to a PC, disconnect the logger from the PC ASAP.**

Memory

The logger contains non-volatile memory so data will not be lost when the battery is changed or expires during data acquisition. Expiration or removal of the battery before downloading data will result in loss of automatic upload capability. Select All of Memory, during the download phase, in these cases.

Please email DaveG@brandelectronics.com with your email address to be notified of software updates pertaining to the HiGee/LoGee product. Thank you!

Device and Software Use

Before you can collect data, you must setup your logger using the PC software:

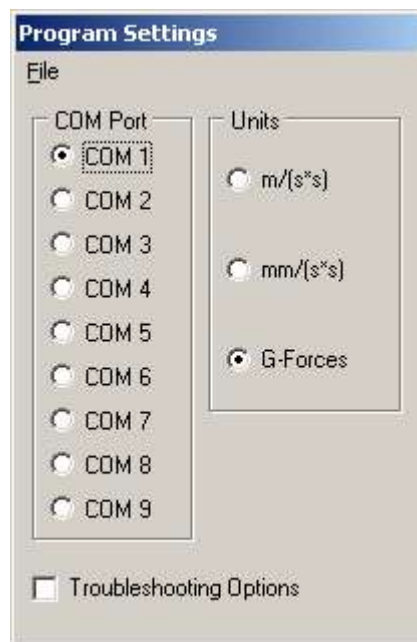
Software Installation

Create a new file directory (suggest HiLoGee), and copy the program files to this directory. You can create a shortcut if desired. (right click the program and select create shortcut).

Software use

Note: If the program issues an error message, try the command again.

- 1) Connect the logger to the PC using the supplied cable. Note the Com port that is used (generally Com 1).
- 2) Run the software by double clicking the .exe file or the shortcut.



3. The first time that you run the PC software you will be directed to the Program Settings page to setup program behavior.

Everything in this box is mandatory. If you do not setup the program correctly, then it will not work properly. The items in this box have hints associated with them. These hints are visible when you hover the mouse over a particular object.

Units

This option allows you to select the units that you would like to view shock data in. The first option is meters per second squared, the second option is millimeters per second squared, and the third option is G-Forces.

COM Port

Specify the COM port that you will interface with the logger through. Be sure that it is in the form COMX, where X is the port number, and that there are NO spaces in this box.

Troubleshooting Options

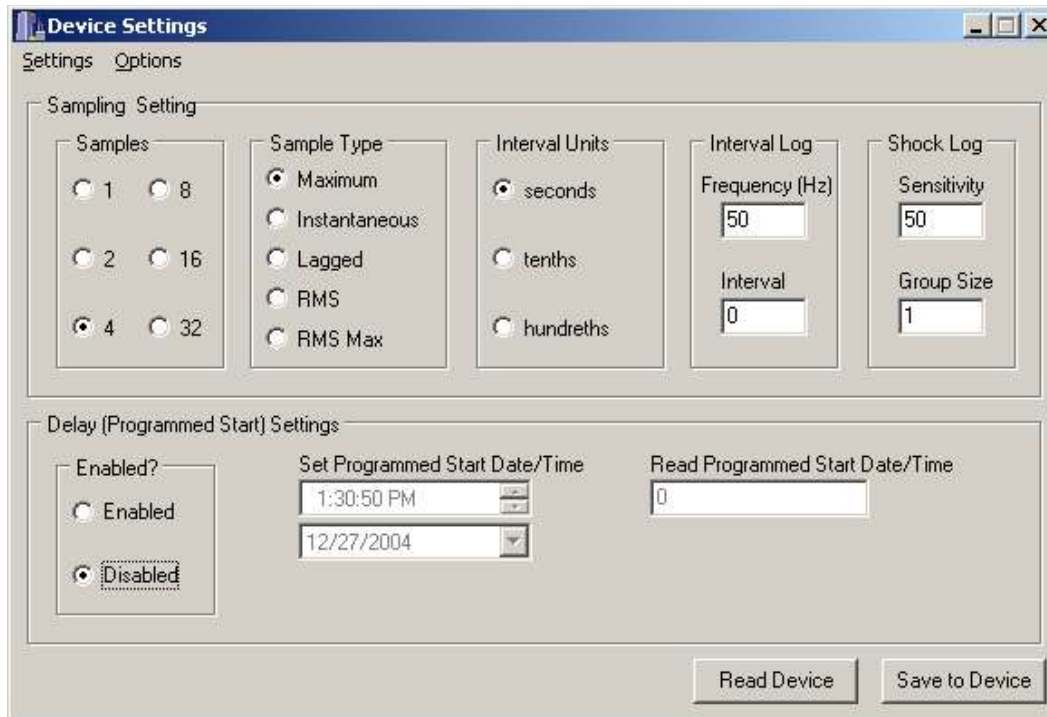
This option allows you to operate the software and logger in a troubleshooting mode and is not recommended for daily use. This option enables certain menus and features to help you diagnose what is wrong with your device.

SETTING UP LOGGER TO COLLECT DATA

1. Connect to the Logger: Select Logger->Connect. The logger status will change to Connected and give a Battery Status.
2. Note the battery condition. Battery life is nominally 3 months. Replace the battery prior to long term use if less than 40%. Otherwise, replace the battery if the status indicates "Low".
3. To setup the Logger, select Logger->Device Settings. A new Device Settings window will open. You must be connected to the device to access this feature.
4. The Device Settings window allows you to change the parameters on the device (described below).

Overview

The logger can operate in two modes: Interval logging and event-mode logging. Event-mode logging is the mode where the logger will only record shock events as they occur; it will not continuously log or log on an interval. For logging on an interval, choose Interval logging. Interval logging is automatically setup when there is a non-zero value in the Interval field under Sampling in the Device Settings window. The Sample Type box becomes accessible with Interval logging. When there is a non-zero value in the Interval field, the logger is in event-mode logging. With event-mode logging, only sensitivity and group-size apply.



The use of this setting depends upon the environment to be sampled. For shock type logging, a setting of 1 G or higher is appropriate. For motion studies, a lower setting is appropriate.

- **Samples** Available in both event-mode logging and interval logging.
This setting determines how many data points should be averaged together to form one sample. The logger samples all channels 1000 times per second. With the sample size set to 1, the logger will take 1000 1-point samples and there will be no averaging done. This will result in high-resolution logging. With sample size set to 2, the logger will take 1000 2-point samples and each of pair of points will be averaged to produce 1000 1-point samples. With sample size set to 4, the logger will take 1000 4-point samples and each quartet of samples will be averaged to produce 1000 4-point samples. The default, and recommended, value is 4. This setting reduces noise in the sampling which yields clean results. For even higher sample sizes, the same rules apply: sample size 8 produces 1000 8-point samples, et cetera. The sample size setting is always applicable to the data that is being logged. That is, this setting affects the behavior of logging independently of any other setting and applies regardless of whether the logger is operating in event-mode logging or interval logging.
- **Sample Type** Available only in interval logging.
 - **Maximum**
A log entry will consist of the point where the highest maximum, of any axis, occurred during the interval. This is not the resultant vector of acceleration for the event.
For example: if, during a time interval T, the X axis experiences the

greatest shock of all the axes, the (X, Y, Z) point corresponding to that shock will be recorded. The Y and Z components of the point are not the maxima for their respective axes but are the states of the Y and Z axes at the time of the maximum on the X axis. This logic applies appropriately for if Y or Z had the maximum during the interval T.

- **Instantaneous**

A log entry will consist of one reading taken during the 1/100 second that an event occurred. That reading will be 1, 2 or 4 samples averaged together depending upon the Sample Size.

- **Lagged**

A log entry will consist of a one-second averaged value. At the end of each interval, a one-second average of each axis will be written to the log file. Think of this setting as instantaneous but only, instead of a 1/100 second instant, this is a one-second instant that occurs at the end of each interval.

- **RMS**

- **RMS Max**

- **Interval Units**

Value from 0-32767 seconds: This selects how often events will be logged

- **Seconds**

- **Tenths**

- **Hundredths**

- **Interval Log**

- **Frequency**

- **Interval**

- **Shock Log**

- **Sensitivity**

Available in both event-mode logging and interval logging.

Value from 0-1024. This sets the threshold below which the logger will NOT record any values. This measurement is linear over its entire range. This means that the change in sensitivity over the range 50 to 100 is the same over the range 900 to 950.

LoGee Specifics:

- 1 G = 50, 2 G = 100, 3 G = 150, etc. These values are approximations that vary slightly from LoGee to LoGee.
- Less-than a setting of 10 (0.20 G) may result in spurious data due to noise.

HiGee Specifics:

- 1 G = 10, 2 G = 20, 3 G = 30, etc. These values are approximations that vary slightly from HiGee to HiGee.
- Less-than a setting of 5 (0.50 G) may result in spurious data due to noise.

- **Group Size**

Available only in event-mode logging.

Value from 1-100. This sets the number of samples recorded when an event occurs. This is different than the sample size. Group size

corresponds to the data that's written to memory versus Sample Size which is the number of data points that comprise a sample. If sensitivity is set to 50 and group size is set to 10, then the logger will record 10 samples when the sensitivity threshold is met. For example, if the logger experiences a shock event, that event is logged and the following 9 samples are logged.

– **Show Default Settings**

Press this button to display settings for the default state of the logger. To save these settings, press Send To Logger.

– **Show Shock Logger Settings**

Press this button to display the settings for making the logger behave on shock events. To save these settings, press Send To Logger.

– **Show Continuous Logger Settings**

Press this button to display the settings for making the logger record settings continuously. The logger will write entries at its maximum rate; 100 entries per second. This setting will consume all memory in about three minutes.

– **Programmed Start Date/Time**

– **Enabled?**

Choose “Enabled” to enable delayed logging.

– **Set Programmed Start Date/Time**

Choose the time and date appropriately from these controls.

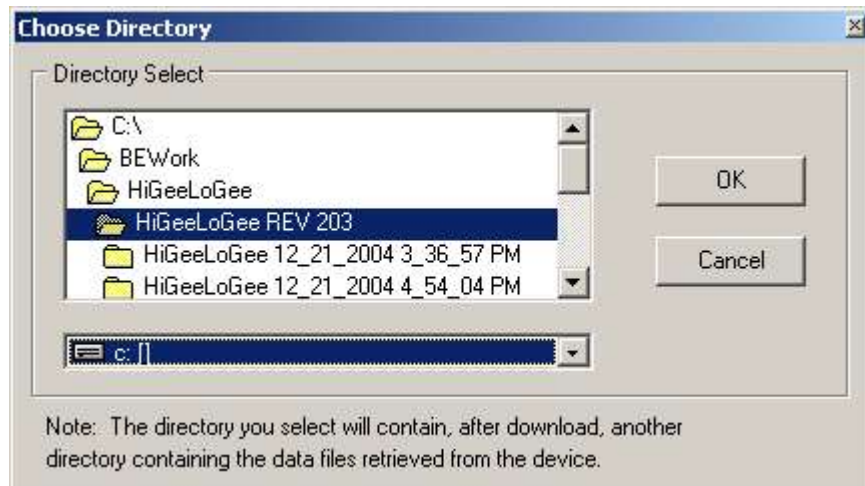
– **Read Programmed Start Date/Time**

This option reports back how many minutes are remaining (from the present moment) until the logger begins logging. A value of 0 in this box means that either the logger is already logging or the delay logging is disabled.

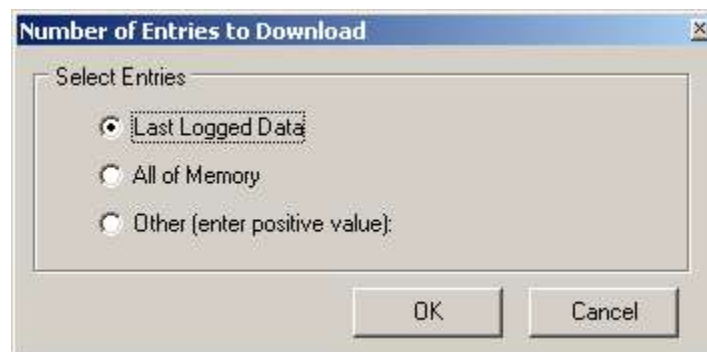
1. When all settings have been selected as desired, click the Save to Device button. The program will report back that the logger has been set. You must save the changes to the device before closing the window or the changes will be lost.
2. You can click the Read Device button to read-back information sent to the logger. This is an easy way to verify that what you wanted written was indeed written to the device.
3. In the main window, select Logger, Arm Logging. This sends the command to the logger to arm logging. If a delay has been set, the logger will not start recording until the delay expires. The logger LED will illuminate for approximately 2 seconds, then be dark for 3 seconds, prior to actual start of logging.
4. Disconnect the logger and deploy to gather data.

DOWNLOADING AND DISPLAYING DATA

- 1) Connect to the logger as previously described.
- 2) Select Logger->Download Data. This will start the download process. Select the desired directory to which you want to save the data. In the directory that you select another directory will be created where the data files will be saved from this download (note window below). Within this directory there will be four downloaded files. There are two Excel-compatible text files, a raw data file and one XYP file. The XYP file is used for the HiGee LoGee Interface program, the raw data is strictly raw data from the device and the two Excel-compatible text files are for rendering the data in Microsoft Excel. One Excel file has the date and time stamps, for the data, decoded for your convenience. The other does not.



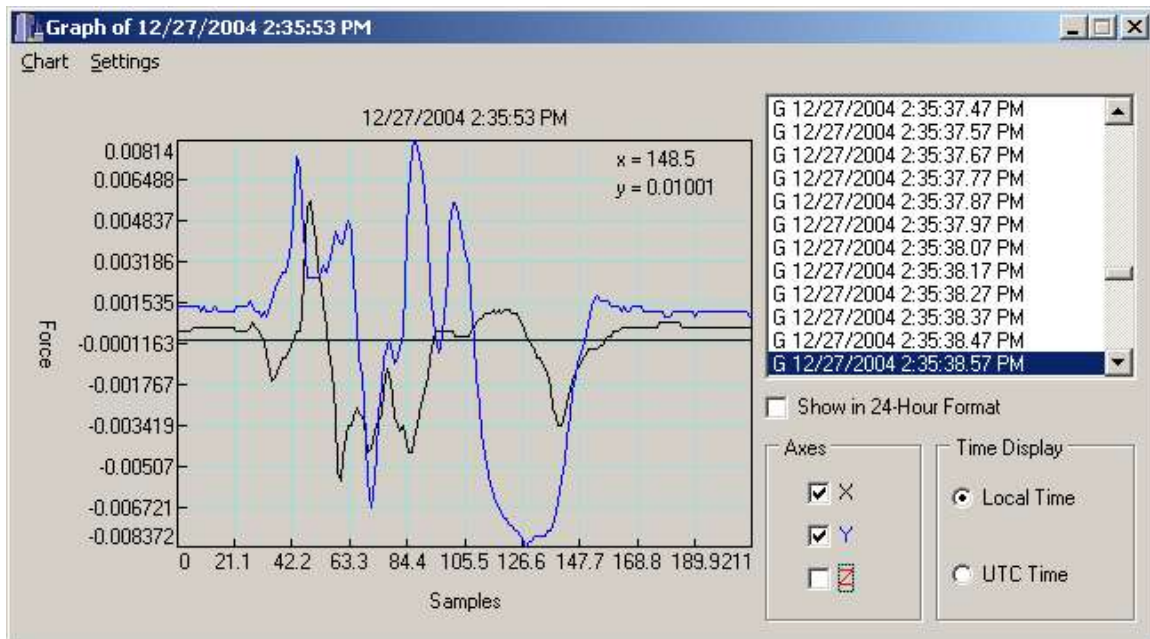
Upon selecting the OK button, this window will appear:



Select the amount of data that you would like to download. If Other is chosen, then a box will appear where you will enter a positive number of entries to download. The download progress is tracked via a progress bar. Large amounts of data can take several minutes to download. The program will notify you when download is complete.

[Note that if the battery has expired, or been changed after data logging and before downloading, automatic upload of data is lost. Select All of Memory in this case to recover the data. Data may not be properly presented in the built in graph viewer. Open one of the Excel text files in the download directory to view data.]

3) Select Data->Graph Chart File. Select the file that contains the downloaded data from step 2. The data will then be presented on a graph.



- Graph use: X, Y, Z data is shown on the graph on the *Graph* Y-axis, and the sample number on the *Graph* X-axis. Use the graph for initial examination of data. [Printing is not enabled in this revision.]

- You can zoom into data by using the mouse and the Ctrl key (press the Ctrl key and use the mouse to create a rectangle to be zoomed). You can scale data by holding the Alt key while performing a click-and-drag in the graph area. Use the mouse to move the relative position of the graph contents. To refresh to graph, double-click the graph area.
- To display a different dataset, close the Data Graph window and go to Data->Graph as you normally would to graph data.

DATA INTERPRETATION

Time: The logger provides a relative time stamp for each entry in 1/100 of seconds. This time starts when the logger is disconnected. If a delay is selected, then the time stamps will start 5 seconds after the delay has expired (if there is any data to log). For example: If a delay of 60 is set (60 minutes, or 1

hour), then the earliest time stamp will be 360500 (60 minutes x 60 seconds x 100 +500). This represents the elapsed time, in 1/100 seconds since the logger was armed. This value has a limit of 4,294,967,296, or approximately 500 days (much longer than the potential battery life!).

The timestamps in the data files, on the other hand, are in a floating point format. An example of this is 38139.54748545138136 where 38139 is the number of days elapsed since 30 December 1899 and 0.54748545138136 is the fractional days (hours, minutes, seconds, msecs) since 12:00am.

Axis Data: Data is saved in G's. For example, 1.5 = 1.5 G's.

EXAMPLES:

Connect the logger as described and select the following:

SHOCK LOGGING:

HiGee:

Sensitivity: 25
Sample Size 4
Group Size 10
Maximum
Interval 30
Delay 30

LoGee:

Sensitivity: 50
Set the rest the same as above.

MOTION STUDY

HiGee:

Sensitivity 0
Sample Size 4
Group Size 1
Instantaneous
Interval 1
Delay 0

TROUBLESHOOTING

When connecting to the device I get an error or the program freezes.

If you get an error connecting to the device, be sure to write the error message down. You can then call or email with the error message. If the program appears to freeze it may not actually be frozen. Please wait

fifteen seconds before deciding that the program is frozen while you're connecting the device.