Blaze® for HVM100

Industrial Hygiene Software
Technical Reference Manual

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Larson Davis

Blaze® Software

for use with the HVM100 Human Vibration Meter

Technical Reference Manual

IBLZ.03 Rev D Supporting Blaze version 6.1

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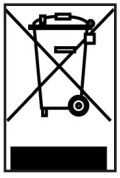

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CHAPTER

1 Introduction

Blaze® software runs on Windows XP®, Windows Vista® and Windows 7® (32 and 64-bit editions). Larson Davis Blaze Software works in conjunction with the Larson Davis HVM100 Human Vibration Meter, the Larson Davis *SoundTrack* LxT and the Larson Davis Spark Personal Noise Dosimeters (Models 703, 703+, 705, 705+, 706 and 706RC). This manual addresses its use with the HVM100 only.

This is a companion manual to the Model HVM100 User Manual which provides step-by-step instruction for the manual operation of the instrument and also detailed explanations of the terminology and measurement functions associated with the three modes of operation offered; Vibration (standard), Hand-Arm (optional) and Whole Body (optional).

Overview

HVM100

The HVM100 is a powerful but small vibration measurement tool. Used as a stand-alone instrument, this handheld vibration analyzer will perform measurement functions appropriate to a variety of applications including; Whole Body Vibration analysis, Hand-Arm Vibration analysis, and general purpose vibration analysis. It features three input channels, a sum channel, a variety of frequency weighting and band limiting settings, single and double integration, displayed data in a variety of units, and independent AC or DC outputs for all three channels simultaneously.

Software

Blaze Software enhances the flexibility and ease-of-use of the HVM100 for these applications by providing setup utilities, instrument calibration, computer-based control of the instrument, data downloading with auto merge capability and versatile report and graphic features.

Formatting Conventions

This manual uses the following formatting conventions:

In step-by-step directions, the process (what you do) is shown in the right column, and the rationale (why you do it) with other cautions and comments shown in the left column. Especially important information are shown in italics.

CHAPTER

2 Getting Started

Installing the Blaze Software

The DVX009 and DVX010 drivers are needed for the IR interfaces, which can be used with the 703, 703+, 705, 705+, 706 and 706RC noise dosimeters. They need not be installed if Blaze is not going to be used with these instruments.

Do not connect the SoundTrack LxT to the computer until the Blaze software has been installed.

Before installing the Blaze software, please write down the product serial number as found on the front of the CD.

Insert the Blaze CD into a computer to run the install program. Follow the installation wizard, entering the serial number when prompted.

You must agree to the License agreement in order to install Blaze Software.

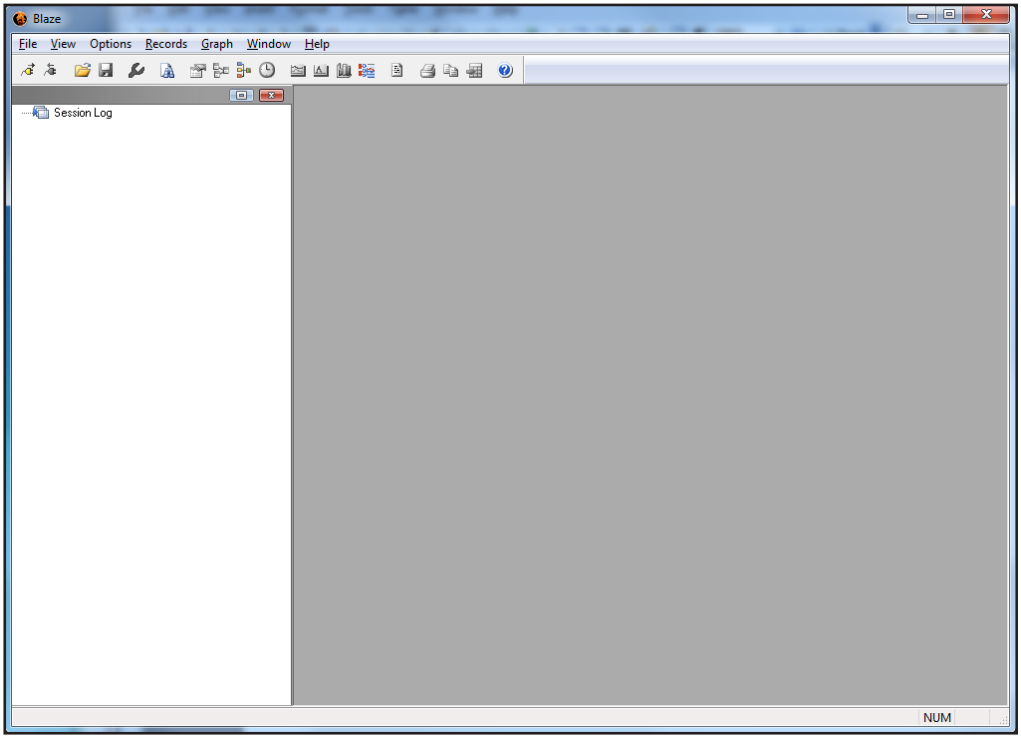
The install program will place a shortcut to the Blaze program on the desktop.

Starting Blaze Software

Double click this shortcut icon to start Blaze.

Blaze Main Window

When the Blaze software is fully loaded, the Blaze Main window is displayed.



Toolbar

Just below the menu bar is the toolbar.

The toolbar provides quick access to commonly used software functions. The following table describes each toolbar function in detail.

Table 2-1 Icons in Main Blaze Toolbar

	The Connect button initiates communication with the HVM100 via the computer serial port.
	The Disconnect button will terminate the connection between Blaze and the HVM100.
	The Open File button will bring up a standard Windows™ browse window that will allow the user to open a previously downloaded file.
	The Save File button will bring up a standard Windows™ save file dialog box, that will allow the user to save the current Blaze file. The dialog window will also allow the user to select a file name and location.
	The Instrument Manager button will bring up the Instrument manager screen. The user can then setup the instrument, set the clock, download data files, etc.
	The Query Files button brings up a dialog window that will allow the user to search through the existing HVM100 download files for records containing specific items.

Table 2-1 Icons in Main Blaze Toolbar

	The Set Parameters button will bring up a dialog box that will allow the user to select the units to be used for the data display and place general information onto the current record.
	The Merge Records button will allow the user to combine two or more downloaded records into a single record.
	The Average File Records button is not available (grayed out) when used with the HVM100.
	The Modify Time History Interval button will allow the user to change the time history period for the current record. Not available (grayed out) when used with the HVM100.
	The Time History Graph button will bring up a time history graph for the current database record.
	The Statistics Graph button will bring up a statistics graph for the current database record. Not available (grayed out) when used with HVM100.
	The Graph Multiple Files button will allow the user to graph records from different files on one graph. Not implemented for use with HVM100.
	The Print button will print the currently displayed record. It will print the active window, whether it is a Time History Graph, a Statistics Graph, or the text data as displayed on the screen.
	The Print Reports button will give you access to the predefined reports that Blaze can print.

Table 2-1 Icons in Main Blaze Toolbar

	The Export Data button will export the currently displayed record as a Comma-Delimited File that can be opened in a spreadsheet application. It will also allow the user to select the output location and file name, and whether or not to automatically launch the viewer application.
	The About button will bring up the Blaze splash screen with the current revision number.

Communication with the HVM100

The computer communicates with the HVM100 via the serial port using a CBL006 serial interface cable. Connect the cable between the Serial Port on the top of the HVM100 and one of the serial ports on the computer.

USB Communication

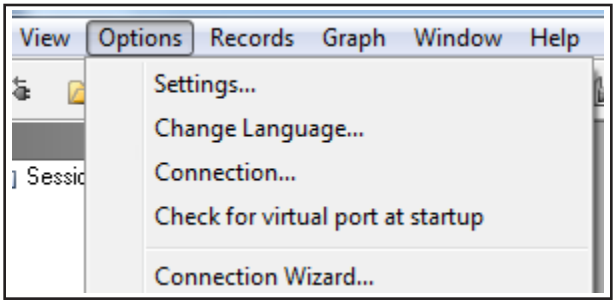
If the computer does not have a serial port, a Larson Davis DVX008A USB Port to Serial Adaptor can be used.

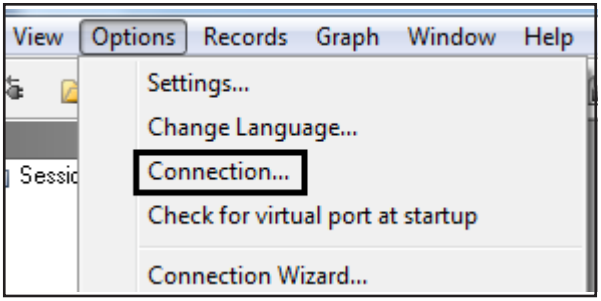
Setting up the Communication

To select the desired method of communication in the Blaze software, open the software.

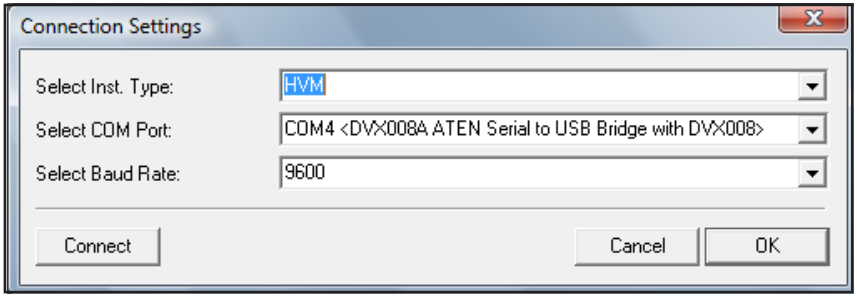
Click **Options** to obtain the following pull down menu.

Select **Connection**





The Connection Settings dialog box will appear.

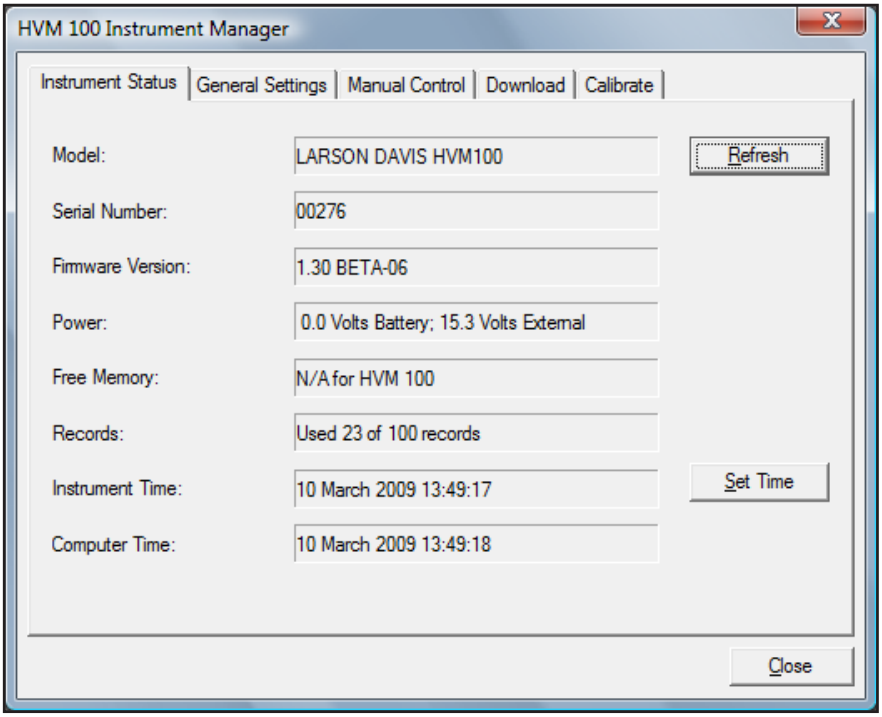


From the Connection Settings dialog box, select HVM100 as the instrument type, the computer Com Port to which the instrument is connected and the desired Baud Rate.

Clicking the **Connect** Button in the Connection Settings dialog box will initiate connection with the HVM100. However, once the connection settings have been set, it will be simpler to click **Connect** on the toolbar.

During the connect process, information is read from the HVM100, which then updates the Session Log with the serial number of the HVM100. Run/stop status is updated whenever initiated by the software.

Following connection, all Setups and their parameters are uploaded to the computer from the HVM100, which may take several seconds, following which the Instrument Manager is displayed.



Most of the operations of the Blaze software are performed from the HVM100 Instrument Manager as described in the following chapter.

CHAPTER

3 HVM100 Instrument Manager

Most of the operations of the Blaze software are controlled from the HVM100 Instrument Manager. Specific features implemented from the Instrument Manager include the following:

- Determination of instrument status; serial number, firmware version, battery status, data records in memory and date/time
- Management of instrument setups, including creation, modification and deletion of setups and utilization of the Setup Manager to work with the setup database
- Manual control of the HVM100 via the PC
- Downloading of data from the HVM100 to the PC
- System calibration

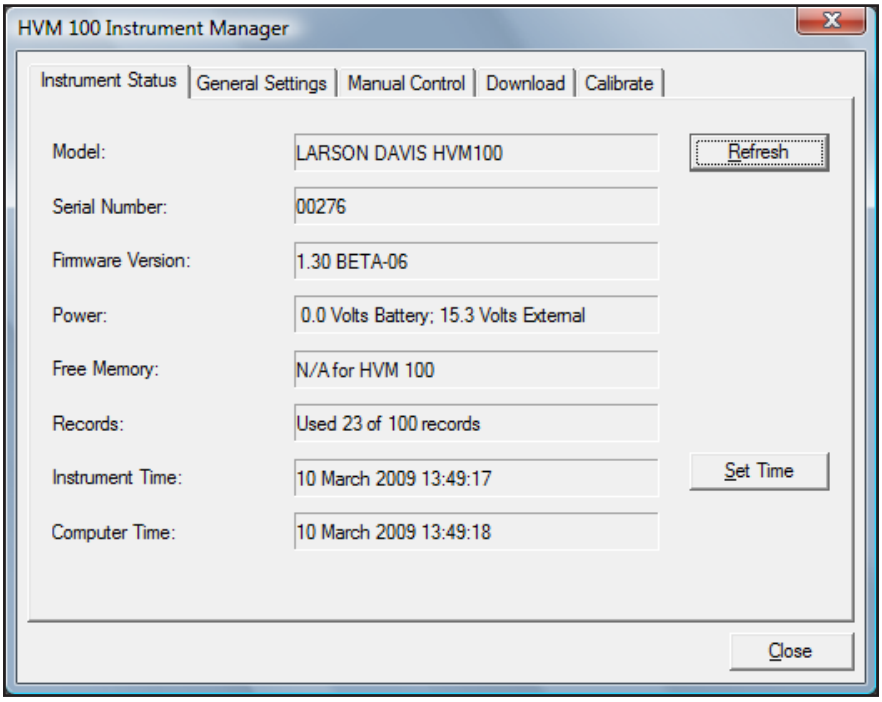
Each of these functions will be discussed in this chapter.

To view the instrument manager window the HVM100 must be connected. If you inadvertently close the Instrument Manager window, you can re-open it by pressing the Instrument Manager icon on the toolbar.

The HVM100 Instrument Manager is displayed following satisfactory connection of the HVM100 and the PC. The functionality is divided among five tab pages entitled Instrument Status, General Settings, Manual Control, Download and Calibrate. Each of these will be addressed in the following sections. The Instrument Manager will initially open with the Instrument Status page selected.

Instrument Status

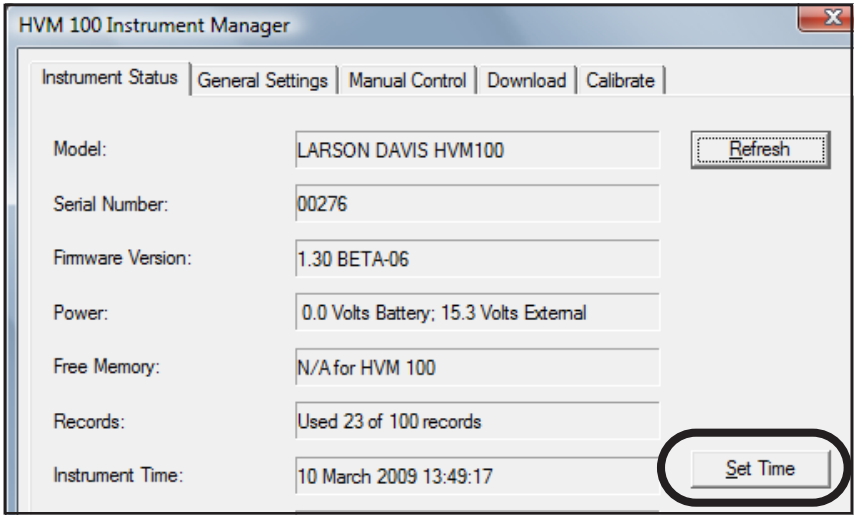
The Instrument Manager is displayed as shown below when Blaze is connected to an HVM100.



Setting the HVM100 clock

Set the date and time of the built-in clock of the HVM100 as follows.

Step 1 Press **Set Time**



"Synchronize to computer time," forces the active HVM100's internal clock to match that of the connected computer.

which will open a pop-up dialog box**.**

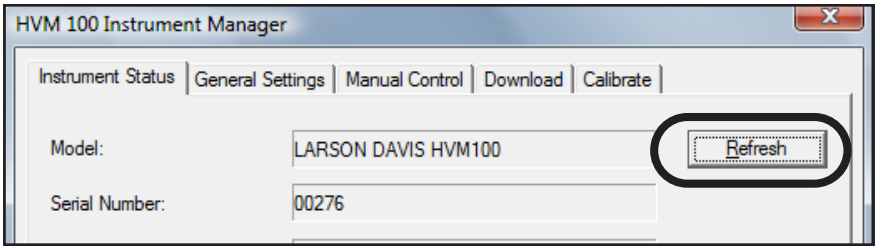
Two options are available.

(A) The time can be set to match the time of the computer's clock by selecting the "Synchronize to computer time" box as shown below and pressing **Set**.

(B) Alternatively, you can manually choose the HVM100 time by deselecting the "synchronize to computer time" box.

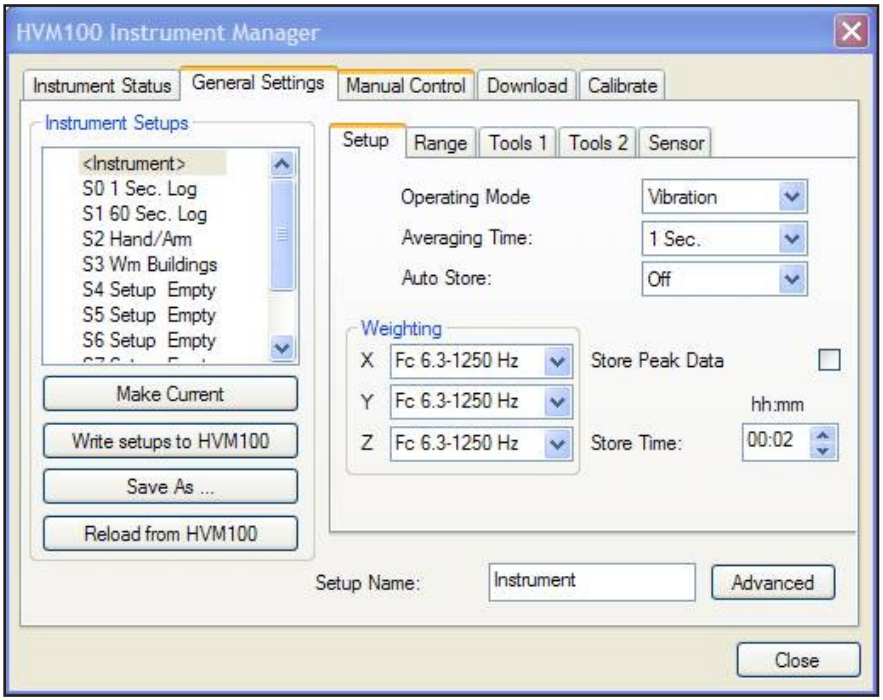
Refreshing the Instrument Status page

In order to update the Instrument Status display to reflect changes in the battery life, memory available, etc. since the window was last opened, click **Refresh**.



General Settings

The General Settings window supports most of the setup functions found in the SETUP, RANGE and TOOL menus of the HVM100. There are ten registers in the HVM100 in which setups may be stored plus one containing the currently active setup. As part of the connection process, the parameters from all of these eleven registers are read to the computer.



When the connection has been successfully completed, the names of the Instrument Setups stored in these registers are listed on the left of the screen under the heading “Instrument Setups”, beginning with the active setup named <Instrument>. Setup information displayed corresponds to the setup which was active at the time of connection.

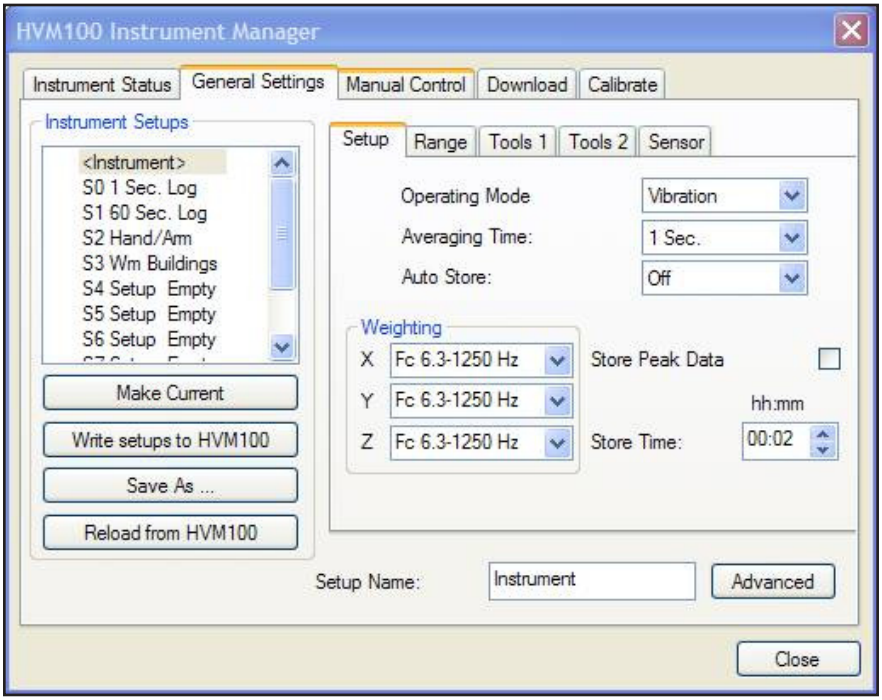
The setup parameters associated with any Instrument Setup will be displayed by highlighting them on the Instrument

Setup list. These setup parameters are distributed among four dialog boxes which appear as shown below when clicking the correspondingly named tab.

General Setting Buttons

The Blaze software provides numerous possibilities for modifying, storing and downloading setups to the HVM100.

A red asterisk (*)appears to the left of the highlighted setup name in the Instrument Setups list to indicate that one or more of the parameters of that setup have been changed.



Replacing the active setup

Make Current will copy the setup information displayed on the right of the screen to the active setup in the HVM100 and also to the Instrument Setup labeled <Instrument> at the top left of the setup list. Thus, to use one of the setups from the

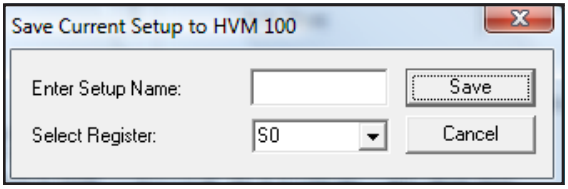
Instrument Setup list as the active setup, simply highlight it and press **Make Current**.

Storing All Setups

Press **Write setups to HVM100** to store the entire list of setups in the Instrument Setups list to the HVM100.

Storing a Single Modified Setup

After the parameters of a setup have been modified, pressing the **Save As** button to display the following dialog box.



Type in a Setup Name and select an HVM100 register into which to store the setup. The information is immediately updated in the HVM and in Blaze instrument manager.

Modifying Setup Parameters

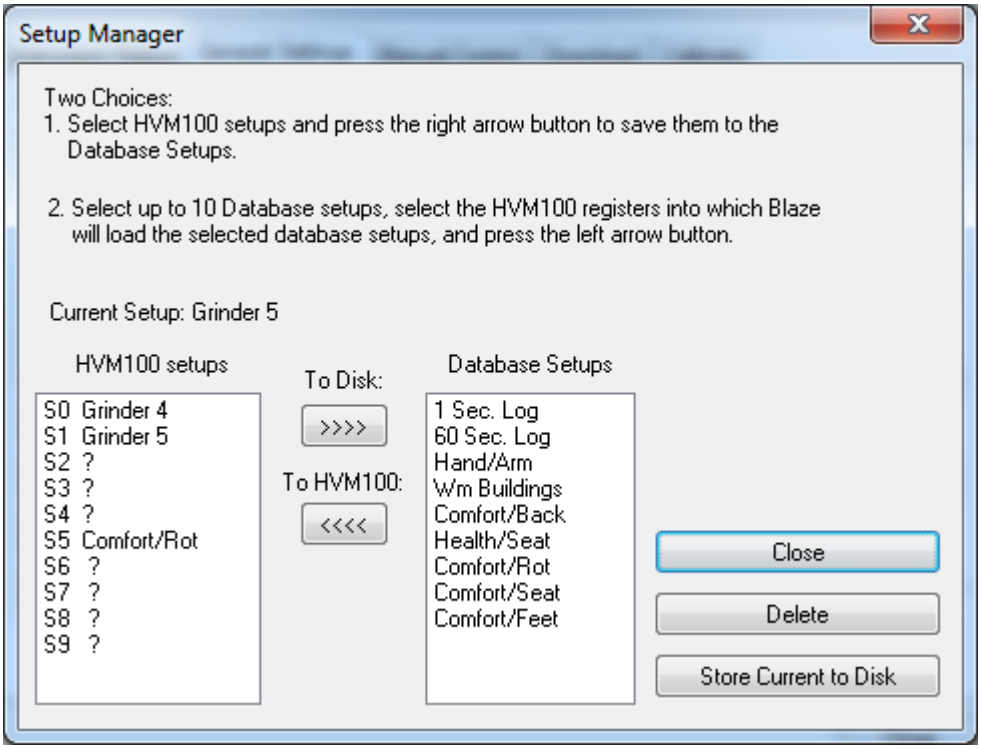
Pressing **Reload from HVM100** will replace the setups in the Instrument Setup list with those in the HVM100. Thus, if the user has modified one or more setups and not stored them, the unstored modified setups will be lost.

Erasing all Setups

It is not possible to utilize the Blaze software to erase setups stored in the HVM100. Use the instrument keypad to erase them, employing the **Erase Setups** item in the Tools Menu. Following this erase operation, from the Blaze software Setup Manager press **Reload from HVM100** to update the Instrument Setups list to reflect the fact that all the setups are now "Not Set".

Setup Manager

Setup manager provides for simple management of the ten setups stored in the HVM100 by allowing them to be chosen from a pre-defined database on a PC. Press **Advanced** on the General Settings tab page to display the Setup Manager dialog box.

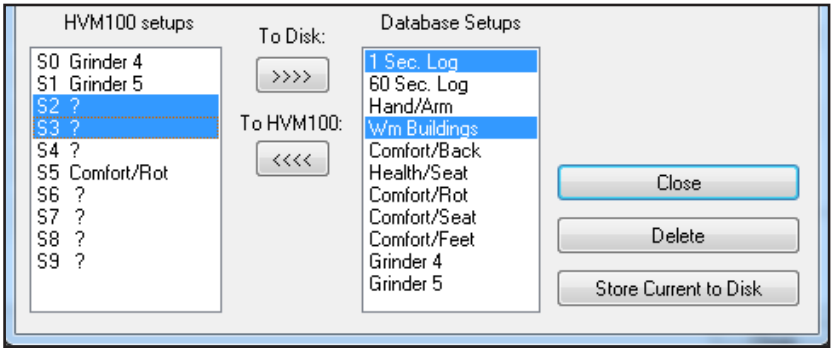


The nine Database Setups listed above are default setups provided with the software which cannot be deleted. The user may create and store new setups which will be added to these default setups, but the list will always contain these nine as a minimum.

Transferring Database Setups to the HVM100

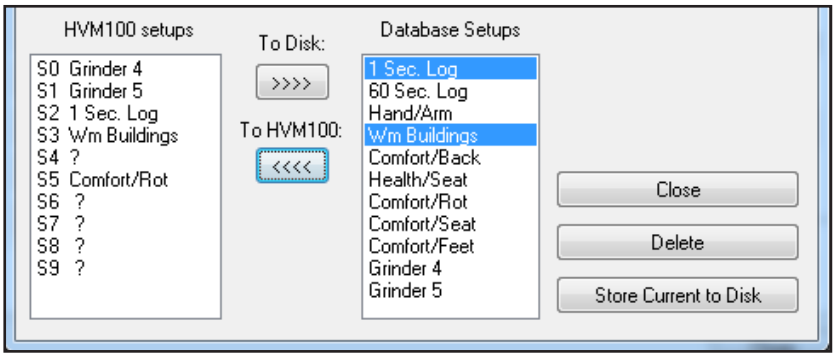
First highlight up to ten Database Setups which are to be transferred to the HVM100 and then highlight an equal

number of HVM100 setups to indicate which HVM100 registers these Database Setups are to be placed.

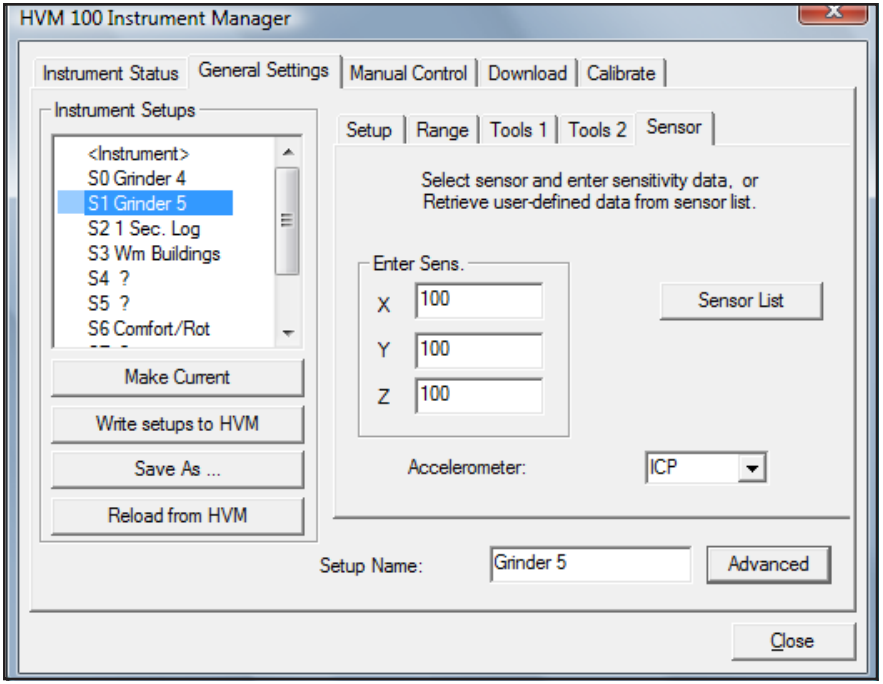


Press the left arrow button beneath **To HVM100** to initiate the transfer.

The Instrument Setup list now includes those setups transferred from the PC to the selected registers.

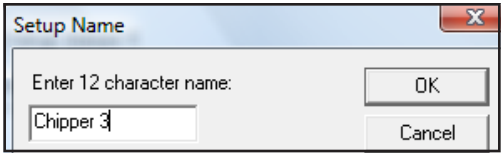


Returning to the Setting Manager by pressing **OK** will confirm that the HVM100 Setups list has also been updated.



Store Current Setup to Disk

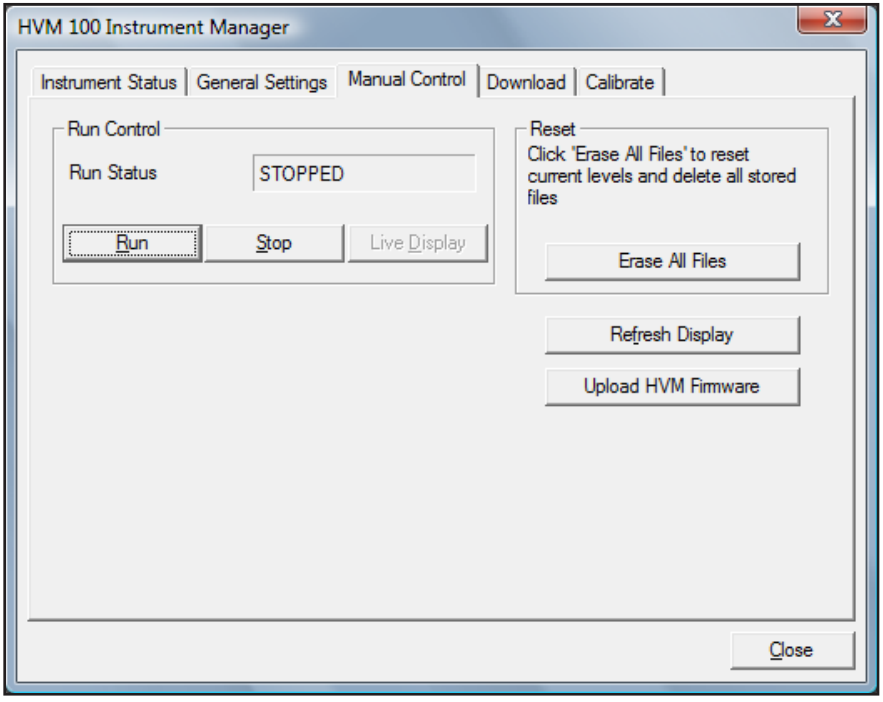
Another way to create a new Database Setup is to work with the General Settings dialog box, setting the parameters as desired using the tab pages provided. Without saving that setup, press **Advanced** to move to the Setup Manager and press **Store Current to Disk**, which will display the Setup Name dialog box.



Type in a name for this setup and press **OK.** This feature permits a user to create a Database Setup without having to first store it to the HVM100. However, the user does have to have an HVM100 connected to be able to perform this operation.

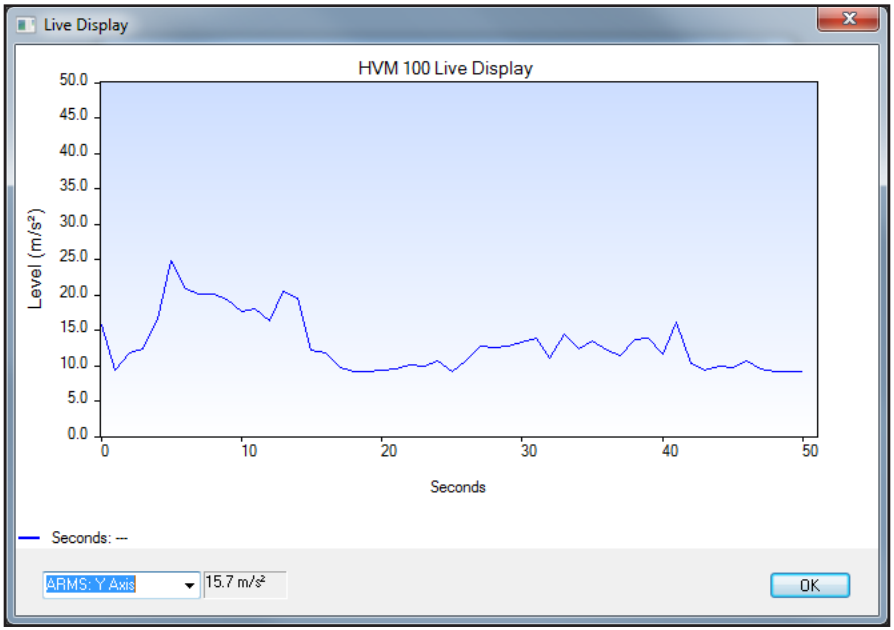
Manual Control of the HVM100

Manual Control provides a means to operate the HVM100 from the PC using the Blaze software. Press the Manual Control tab in the Instrument Manager window to open the Manual Control dialog window.



Observing the Live Display

Press **Live Display** when the HVM100 is running to see a running 50-second window of the time history of one of the measured parameters.



Resetting Data in the HVM100

To clear the memory in the connected HVM100, press **Erase All Files.** This deletes the current measurement and all stored data residing in the on-board memory of the HVM100.

WARNING: Caution should be exercised when using this function, as deleted data cannot be recovered. Data that you wish to save should be downloaded prior to using the Reset Data function

Upgrading HVM100 Firmware

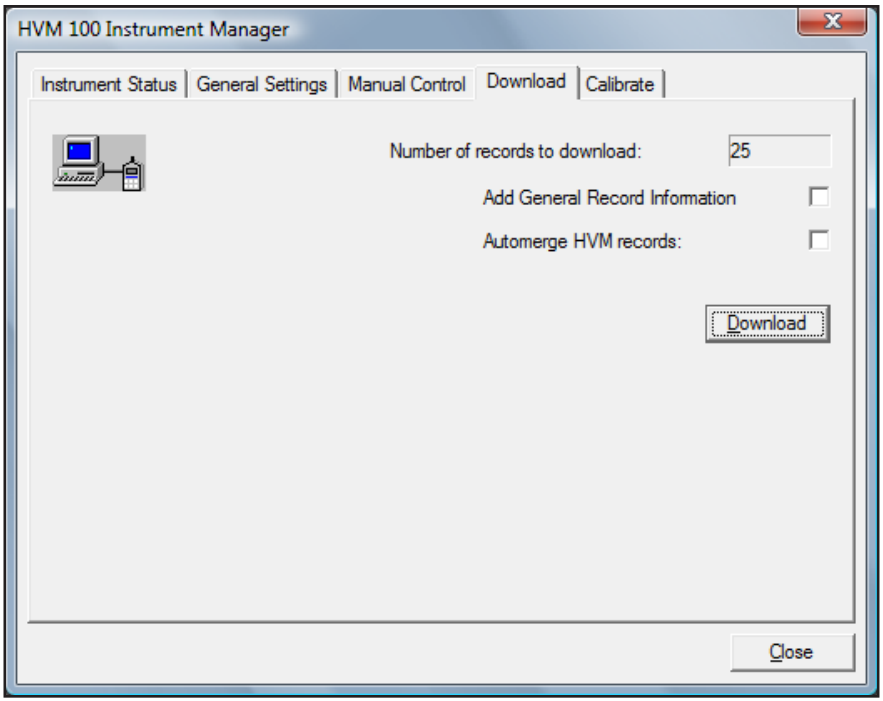
WARNING: Verify that the HVM100 has good batteries before reprogramming. Do not disconnect CBL006 until after reprogramming is finished.

Note: Firmware programmer in Blaze Demo is fully functional and can be used to update firmware.

Select **Upload HVM100 Firmware** to load new firmware into the attached HVM100. to complete the firmware reprogramming, follow the instructions in the wizard.

Downloading Data from the HVM100 to the PC

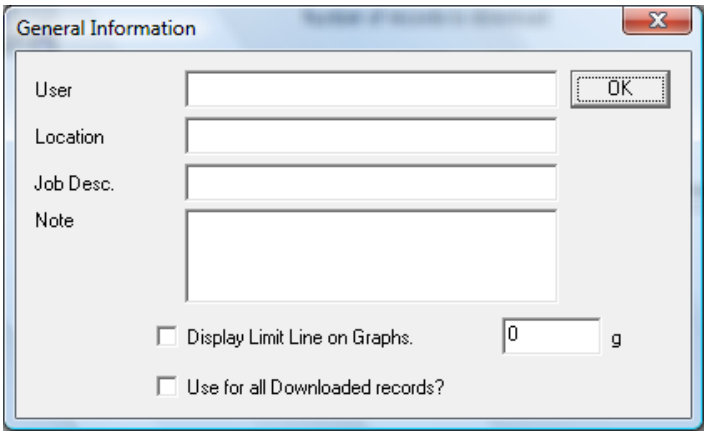
From the Instrument Manager dialog box, press the **Download** tab to display the Download dialog box.



The number of records stored in the HVM100 and ready for download is indicated at the upper right of the page.

Add General Information

By selecting the **Add General Record Information** box before downloading, you will be able to add general information to each of the downloaded records during the download process. As soon as the download is initiated, the following dialog box is displayed into which information can be entered using the computer keyboard. Pressing **OK** will continue the download process.



If the **Use for all Downloaded records** box is selected, this information will be stored with all downloaded records and there will be no further interruptions during the remainder of the download process.

Note: The general information stored during download can be modified later or, if it has not been added during download, it can be added later as well.

If the **Use for all Downloaded records** box is not selected, the same dialog box will be opened as each record is downloaded, permitting the user to modify the general information to be stored with that particular record before the next record is downloaded.

Automerge Records

Each data record stored in the HVM100 contains a Time History table. The user can select to have similar files automerged during the download process by checking the box labeled **Automerge HVM100 records** prior to initiating the download process.

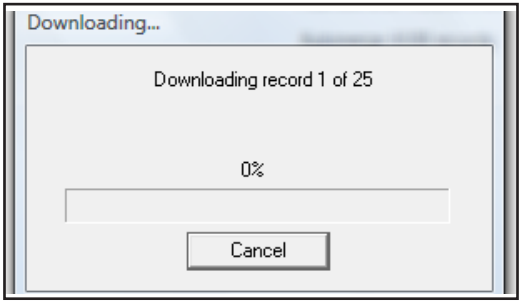
For the automerge to work correctly, the HVM100 must be configured for “Autostore On”. In addition the “Store Time” parameter must be set so that the HVM100 only collects 120 time history samples (or less) before autostoring the file. More time history samples) can be collected if “2nd History = None” (i.e. the peak value isn't being stored in the time history).

For example, if Averaging = 1sec, the Store Time must be 00:02 or less (2 minutes or less). This will ensure that only 120 time history samples are collected before the file is autostored. If the peak value is not being stored in the time history, the Store Time must be 00:04 or less (4 minutes or less).

For more detailed information on the data structure of the time history and the merging of time history records, see Merging Records on page 4-6.

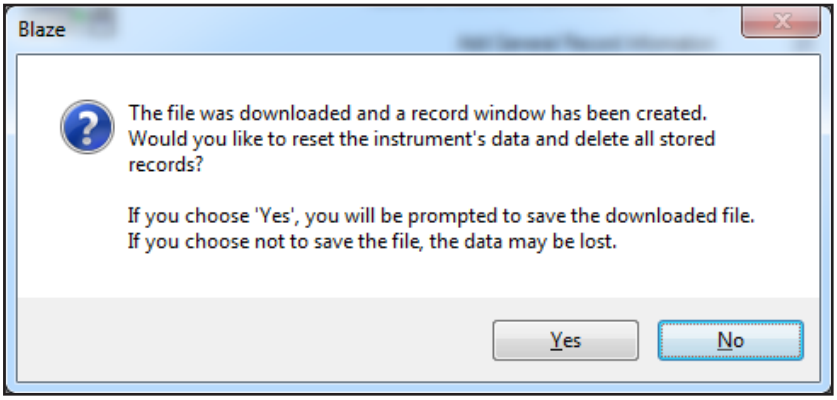
Initiating the Download

If neither of the boxes labeled **Add General Record Information** or **Automerge HVM100 records** is checked, clicking on the **Download** button will initiate the download of data from the HVM100 to the PC. A download status window will appear on the screen indicating the progress of the download operation.



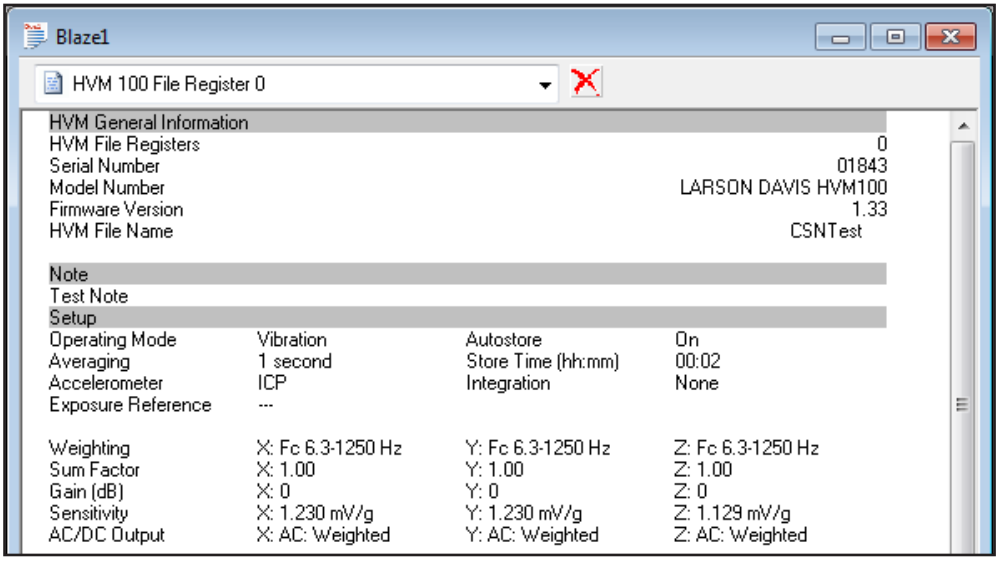
Resetting HVM100 Data

When the download is complete the download status window will close and the following dialog box will appear.



This indicates a successful transfer of the data records from the HVM100 to the PC via the software.

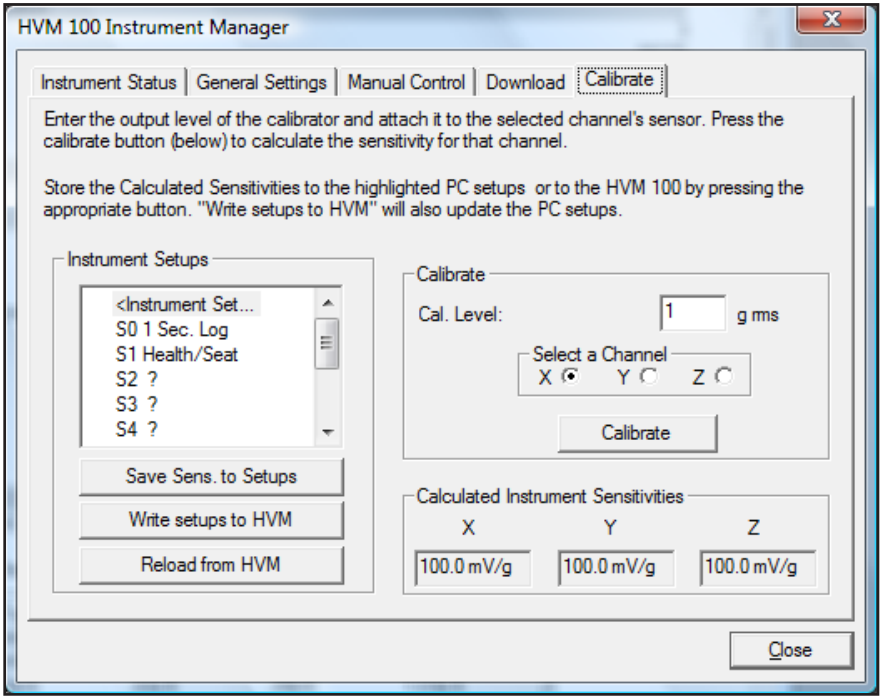
If the HVM100 is running when **Download** is pressed, the unit will stop running and the download will occur. The data contained in the first downloaded record will be displayed as shown below.



For a detailed description of the Measurement Summary and its associated data presentation features, see Measurement Summary on page 4-1.

Calibrating the HVM100

It is always good practice to calibrate the HVM100 before each measurement. To calibrate, select the Calibrate tab page from the Instrument Manager dialog box to display the Calibrate dialog box.



The sensitivity values displayed on the right side of the screen are either values entered at the time the setup was created or values determined as a result of a previous calibration.

Portable handheld shakers are typically used for the field calibration of instruments using accelerometers. For example, the PCB 394C06 Portable 1g Handheld Shaker can be set to excite an attached accelerometer at a level of 1g RMS. Note that triaxial accelerometers are calibrated one

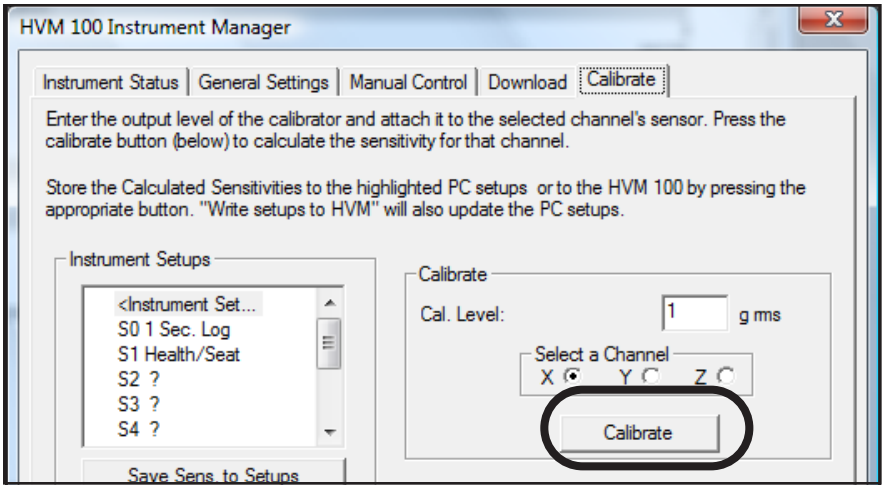
axis at a time by selecting the appropriate channel (X, Y or Z).

Step 1 Type the vibration level produced by the shaker, in units of g rms, into the Cal. Level data field.

Step 2 For a triaxial accelerometer, select the accelerometer axis (X, Y or Z) to be calibrated. For a uniaxial accelerometer, leave the X box checked.

Step 3 Use a mounting stud or wax to attach the accelerometer to the moveable head of the shaker with the axis to be calibrated aligned with the long axis of the calibrator. For triaxial accelerometers, the orientation of these axes should be indicated on the accelerometer body.

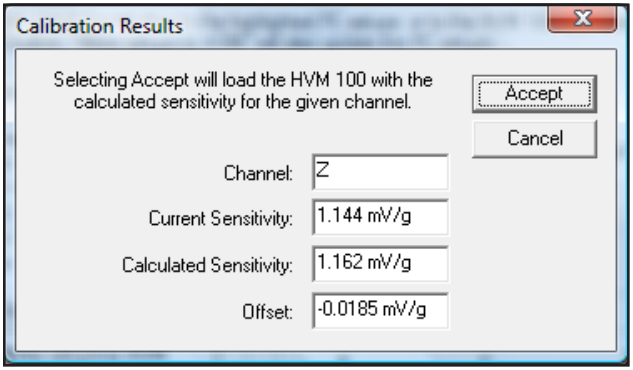
Step 4 Press **Calibrate** to initiate the calibration process.



Prompts will appear on the screen asking you to confirm that the calibration data may be reset and that the accelerometer is properly connected and that the calibrator is operating. A response of **No** to either of these prompts will abort the calibration process. The calibration process will continue if both prompts are answered **Yes**.

Step 5 During the calibration process, the **Calibrate** button will change to an **Abort** button. Pressing this will stop the calibration process.

Step 6 When the calibration process is complete, the following screen will appear indicating the accelerometer axis being calibrated, the current sensitivity (determined from a previous calibration), the actual sensitivity as determined by the calibration just concluded and the offset associated with this new calibration. If the result of this calibration is acceptable, click **Accept**. Otherwise click **Cancel** and determine whether the unacceptable result indicates a fault in the accelerometer under test or a mistake made in the setup of the calibration procedure.



The HVM100 sensitivity is changed when Accept is clicked. No setups are changed by this action.

Following an Accept action, the value of the Calculated Sensitivity just measured will appear in the corresponding box on the right of the screen. The corresponding sensitivity in the active HVM100 will be changed as well. If you want to save the active setup, go to the General Settings on page 3-5 and select "save as".

If using a triaxial accelerometer, continue to calibrate the remaining channels of the HVM100.

Saving the Calculated Sensitivity Values to Setups

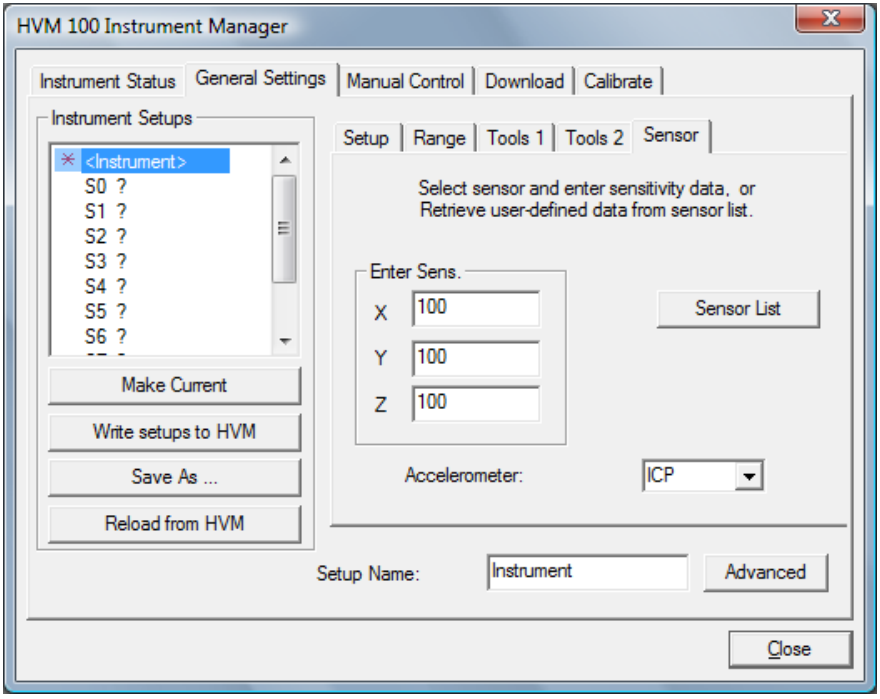
If you wish to update the sensitivity values contained in any of the setups to those calculated from the calibration, highlight them on the Instrument Setups List on the left portion of the dialog box. To highlight a single setup, simply left click on that setup name. To highlight a series of setups, left click on the first setup in the series, then hold down the Shift key while left clicking the last setup in the series. To select individual setups, hold down the Ctrl key while left clicking each setup name in turn.

Press **Save Sens. to Setups** to complete the save action. This will not save the updated setups to the HVM100, but prepares the setups to be loaded into the HVM100. The changed setups will have a red asterisk (*) placed before them on this page and on the General Setups page. Any measurements made prior to transferring the setups to the HVM100 will be made using the old sensitivity values.

Most often you will want to update the sensitivity values in both the computer and the HVM100

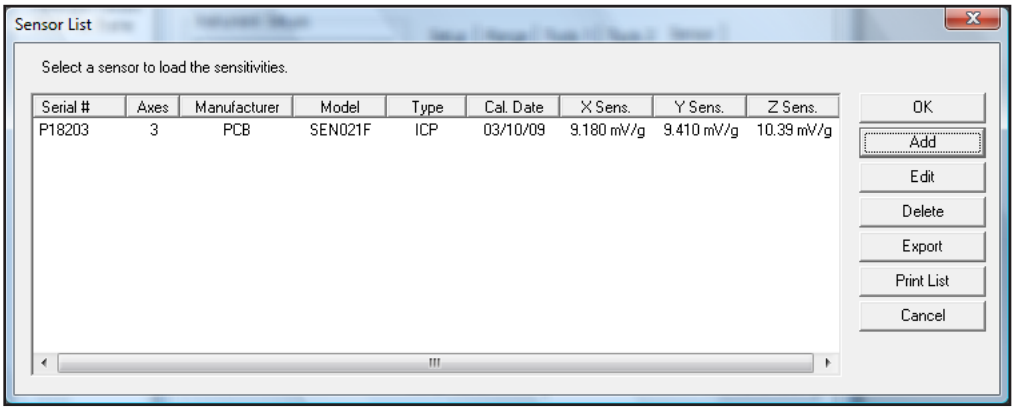
To update the sensitivity values of the highlighted setups in the Instrument Setup List in both the computer and the HVM100, press **Write Setups to HVM100.** This will remove the red asterisk. The HVM100 will then be ready to take measurements using the updated sensitivity values.

Working with the Sensor List



In addition to displaying the accelerometer type and its sensitivity, the Sensor Tab page permits access to a transducer database in the form of a sensor list from which a user can select a sensor, add/edit a sensor, delete a sensor or

print the sensor list. Click **Sensor List** to display the sensor list dialog box.



Printing the Sensor List

Press **Print List** to send the list to a printer.

Coping Sensor Sensitivity from Sensor List to Sensor Tab

A very efficient way to input the sensitivity of a particular sensor into the Sensitivity boxes on the Sensor tab page of the Instrument Manager is to insert them directly from the Sensor List.

To do this, simply highlight that sensor and press **OK.**

CHAPTER

4 Data Presentation

A download of data from the HVM100 provides setup information, overall data and time history data for each register in the HVM100 which has data. These data are presented on-screen as a series of Measurement Summaries, one for each register or set of merged registers.

In this chapter we will discuss operations related to the Measurement Summary, which provides numeric values of overall and time history data. We will show how to change the units used for these data presentations and how to merge records to create time histories longer than can be stored within a single record in the HVM100.

Measurement Summary

Note: *There can be a slight rounding difference between values measured and displayed on the HVM100 and those downloaded and displayed on the computer. This difference will be less than 0.1 dB.*

Following a download from the HVM100, the Measurement Summary window presents a summary of complete information from the first measurement record. The units utilized in the summary can be chosen as m/s^2, cm/s^2, ft/s^2, in/s^2, g and dB, see “Displaying Other Data Records” on page 4-6.

Overall Data

The Overall Data section provides the runtime of the measurement and values of the overall parameters for that measurement period.

Overall Data
Run Time (hh:mm:ss) 00:04:00

Value	Channel X	Channel Y	Channel Z	Sum	Units
Aeq	.97200	1.7600	1.6600	2.0000	m/s²
Amax	2.4000	3.3700	2.3800	3.5800	m/s²
Amp	9.2800	9.2800	7.4600	4.6300	m/s²
Amin	.000435	.89000	1.2000	1.0800	m/s²
Aeq(k)	.97200	1.7600	1.6600		m/s²
VDV	7.3700	10.400	8.6100	10.800	
CFmp	19.600	14.500	13.000	7.2800	dB
A(8)				.22500	m/s²

Operating Mode Dependency

The specific overall parameters measured depend upon the Operating Mode of the measurement (Vibration, Hand-Arm or Whole Body). All Operating Modes measure and report the overall parameters described in Table 4-1.

Table 4-1:Overall Parameters Measured in all Modes

Parameter Symbol	Parameter Name
Aeq	Long Term Energy Average
Amax	Maximum Level
Amp	Maximum Peak Level
Amin	Minimum Level

In addition to the overall parameters in Table 4-1, measurements made using the Hand-Arm Mode will also measure and report the overall parameters described in Table 4-2.

Table 4-2:Additional Overall Parameters Measured in Hand-Arm Mode

Parameter Symbol	Parameter Name
A(1), A(2), A(4), A(8)	Energy Equivalent Level averaged over the run time and reallocated to a time period equal to the number of houses indicated within the parentheses
A(8) Exp	Allowed Exposure Time (in hours) based on the measured A(8) value and the selected criterion level
Exposure Points	Dosage points accumulated. Recommended dosage per day: 0-100. Critical limit per day: 400

In addition to the parameters presented in Table 4-1, measurements made using the Whole Body Mode will also measure and report the overall parameters described in Table 4-3.

Table 4-3:Additional Overall Parameters Measured in Whole Body Mode

Parameter Symbol	Parameter Name
VDV (not calculated when the units have been set to "g" or "dB")	Vibration Dose Value
CFmp	Long Term Crest Factor
A(8)	Energy Equivalent Level averaged over the run time and reallocated to an 8-hour time period

Time History Data

The HVM100 has a circular buffer into which measured Arms levels are stored at selected time intervals (one second when averaging is set to "Slow"). This buffer will store up to 240 values of X, Y, Z and Sum; 120 values if Peak values are stored as well. Since it is a circular buffer, once it is full it will drop the oldest time samples as new ones are stored, meaning that at any time after that it contains the last 240 (120 with peak) samples.

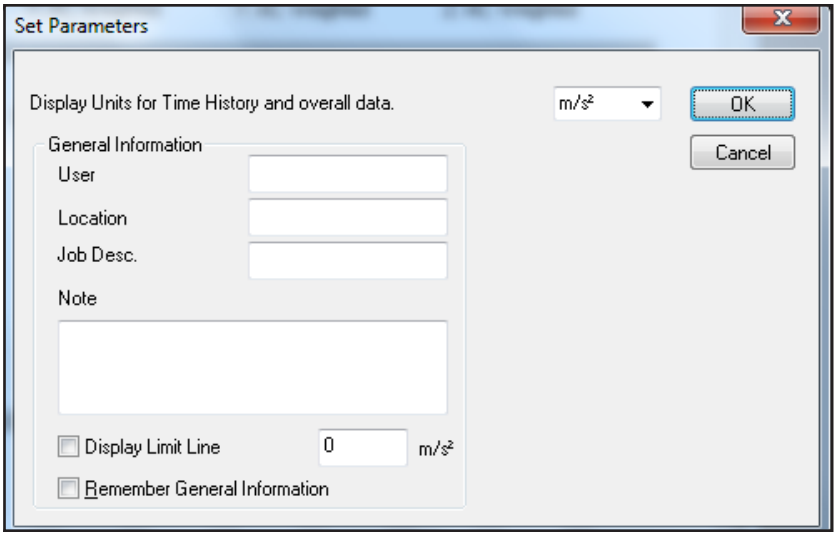
These data appear in the Time History section of Measurement Summary, along with the file name, register number in the HVM100 where it was stored, date/time and units.

Time History File Name	Grinder 1		Register 0					
Measurement Time	12 Mar 09 18:20:18							
Units	m/s²							
TIME	X RMS	PEAK	Y RMS	PEAK	Z RMS	PEAK	S RMS	PEAK
18:20:23	.93300	4.0100	.70900	2.2400	.31600	1.4400	1.2100	4.1900
18:20:28	1.3800	4.1500	.90500	3.6600	.55800	3.2000	1.7400	4.5600
18:20:33	.97600	3.0300	1.2100	4.5800	.96300	3.8900	1.8200	5.1200

Set Parameters Menu

The Set Parameters dialog box is used to select display units, set general information, and select a time history limit line.

Open the **Set Parameters** dialog box by clicking the **Set Result Parameters** button on the toolbar (or click **Records/ Set Parameters).** The following dialog box will be displayed.



Selecting Units

Note: dB units can be defined relative to either 10^{-5} or 10^{-6} m/s^2 as set from the HVM100 Instrument Manager/General Settings/Range tab page.

The presently active units are indicated in a window labeled "Display Units for Time History and overall data" on the upper left of the dialog box. Cursor down to highlight the new units desired.

The units used in the measurement summary for the displayed record and any subsequently opened records will be those selected by the above operation. The summary measurement window must be active before the "Set Parameters" button can be selected.

Setting a Reference Line for the Time History Graph

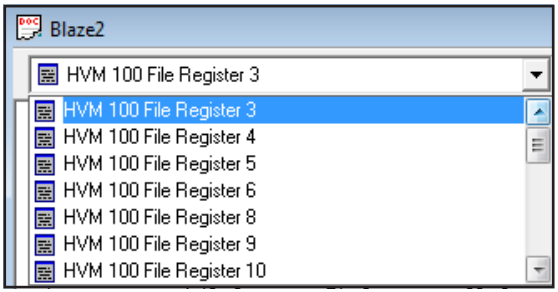
Blaze allows you to define a limit line that will appear on the Measurement Summary Time History Graph and the Summary Report Time History Graph. The limit is set individually for each record.

In the Set Parameters dialog box, check the box labeled "Display Limit Line", enter a value of amplitude defining the vertical position of the reference line, and click **OK**.

Displaying Other Data Records

At the conclusion of a data download, the Measurement Summary for the first record downloaded is displayed. Any record from the download can be similarly displayed as follows:

Left Mouse click the top of the Data Record window to open a drop-down menu and select the desired record.



Merging Records

A unique data record is created every time a measurement is stored in the HVM100, whether it is a manual storage operation resulting from the user pressing the **STORE** key or an autostorage operation programmed by the user. Blaze allows the user to merge records provided they have been measured using identical setups.

A practical application of merging: Measure a worker's exposure to vibration during separate morning and afternoon measurement sessions then merge them to obtain exposure data covering the full day.

When records are merged, the overall parameters are recalculated based on the data contained in all the records and the time history data are concatenated, meaning that a single time record is created by joining the separate time records together sequentially. During the merge operation, the time history sequences are arranged in order of their date/time stamps, but the gaps between records, if any, are removed.

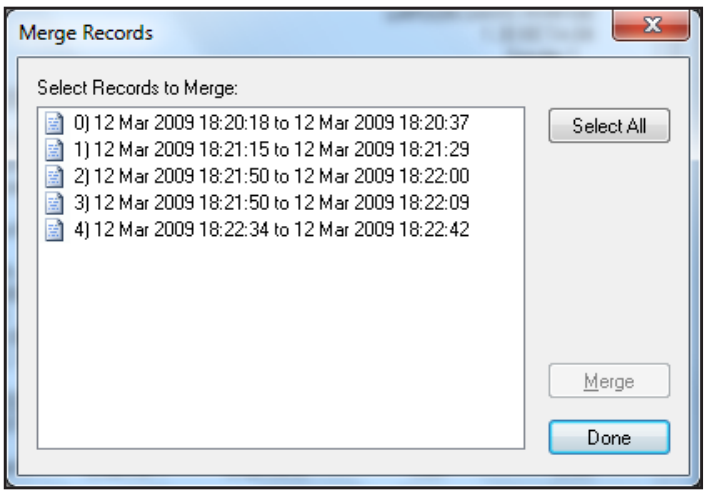
Note: When storing records, be sure to reset the instrument before starting the measurement; otherwise, the next record will include the previously stored data as well as the new data.

For example, suppose that the instrument setup calls for data to be stored every second and that five separate one minute measurements are made and stored manually with a waiting period of four minutes between the end of one measurement and the beginning of the next. Each time history record will contain sixty data points at one second intervals, but the time corresponding to the first data point in each record will be five minutes later than the first data point in the preceding record and five minutes earlier than the first data point in the following record. The concatenation will remove these four minute gaps such that the merged time history will contain three-hundred data points at one second intervals beginning at the time of the first data point in the first of the measurement records.

Manual Merging

The procedure for merging two or more similar data files is as follows:

Click the **Merge Records** icon on the toolbar (or click **Records/Merge Records**) to open a window listing the records available for merging.

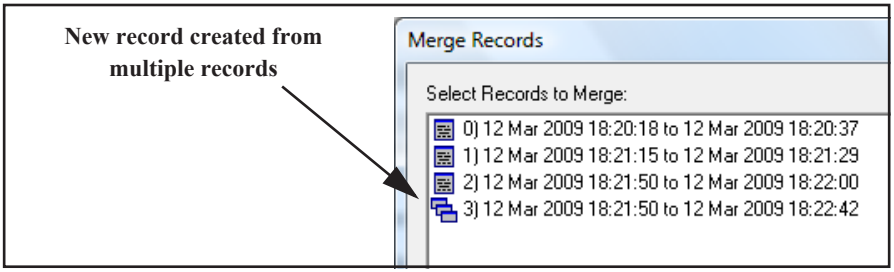


Step 1 Select the records you wish to merge. More than two records can be selected.

If the records to be merged are listed sequentially, you can select them as a block. Begin with a Left Mouse click on the first record, then hold down the Shift key while using another Left Mouse click to select the last record in the sequence. This will highlight all the records in the sequence.

If the records to be merged are not listed in a single sequence, use a Left Mouse click to select the first record, then hold down the Control key while clicking on each additional record you wish to have merged with the first.

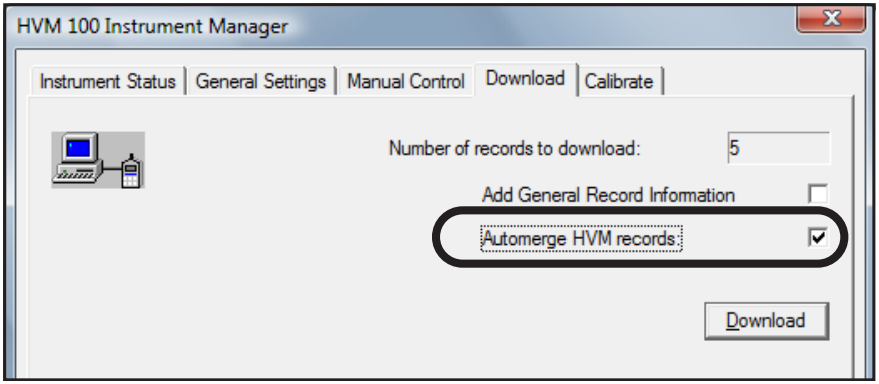
Step 2 With all records to be merged highlighted, press **Merge**. The new merged file will be added to the records list, with an icon representing a combination of overlapped records to indicate that it is a record which has been created by the merging of records rather than by an actual measurement. The following graphic shows the display which appears after records 3-4 from a list of 5 records were merged.



Press **Done** to close the Merge Records dialog box. To display the new record, open the records pull-down list at the top of the Data Record window, highlight the merged record and click with the left mouse button.

Automerging Records During Download

If the information in the individual records stored in the HVM100 is not required, the automerge feature can be used to automatically merge records of similar types during the download process. Automerging is activated from the Download dialog box in the HVM100 Instrument Manager by checking the **Automerge HVM100 records** box prior to initiating a download.



The listing of records following the download will show merged records with their multiple-folder icons instead of the original records which were merged into them. Records which did not match any others will appear separately as standard records. Automerge is very useful for the creation of time history records larger than the 240 sample limit (120 with peak data) for individual records stored in the HVM100.

To create a time history record larger than the capacity of a single time history record in the HVM100, setup the measurement for an autostore using averaging time and store time selected such that the total number of samples will not exceed the capacity of a single record (240 or 120 with Peak Store enabled). Start the measurement, let the instrument autostore for the desired time period (limited by the memory capacity of the HVM100, 100 records) and automerge during download to obtain a single gap-less time history for the total time period.

CHAPTER

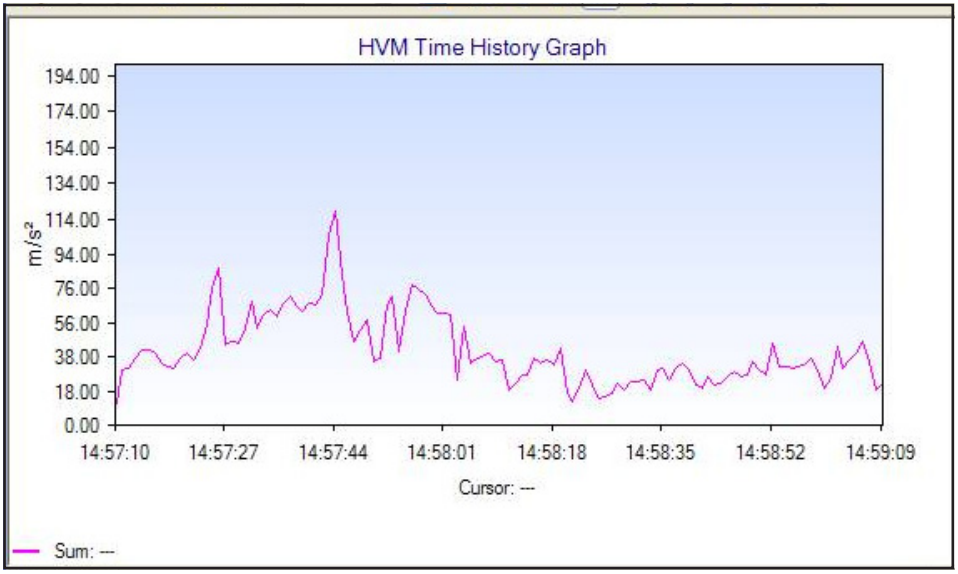
5 Graphic Presentations

The Blaze Software includes very powerful and flexible graphics capabilities for displaying and examining the time history data download from the HVM100. This chapter describes the features and utilization of this graphics software.

Time History Graph

Click the **Time History** icon on the toolbar (or click **Graph/Time History Graph**) to view a time history of the active measurement summary record (multiple summary windows can be open at the same time).

The Time History graph will appear as shown below.



A new toolbar is provided for use with Time History graph.

The functions provided by the first ten icons in the Time History toolbar are shown in the following figure.

Icon	Function
	Zoom In - Puts graph into Zoom mode - Allows user to drag a rectangle over the graph to zoom to it - A second click puts the graph back into the interactive mode
	Zoom Out - Restores the previous zoom state if zoomed in multiple times - Disabled when graph is at 100%
	Zoom to original size - Zooms out to original size - Put the graph into the interactive mode
	Copy - Copies the image into memory so that it can be pasted into another program
	Edit Mode - Puts the graph into edit mode
	Edit - Changes currently selected edit file to modify values
	Exclude - Excludes the currently selected edit field
	Restore Data - Deletes all edit fields, restoring data to their original values

Icon	Function
	Create New Record - Takes the currently selected edit field and creates a new record from it
	Add Note - Sets the graph in a mode to paste a new note next time the graph is clicked

Selection of Data Displayed

The Time History toolbar icons shown below are used to select or deselect which data will appear on the graph. Clicking each will toggle the status between **Display**, which places a frame around the icon as illustrated by the first icon, or **No Display**, for which no frame appears, as illustrated by the remaining icons.

Note: Peak time history values will only be displayed if they were measured, as called for in the setup associated with that record. If not, the peak level icons will be grayed out.

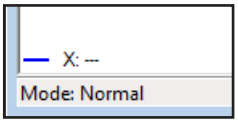
The first three icons represent r.m.s levels along the three axes, the fourth represents the sum value of the three r.ms. values. The next four represent peak levels along the three axes and the sum of these levels.

Graph Modes

The display can be utilized in three different modes:

- Normal (Interactive) Mode: described in the following section.
- Zoom Mode: described in the section "Zoom Mode" on page 5-6.
- Edit Mode: described in the section "Edit Mode" on page 5-8.

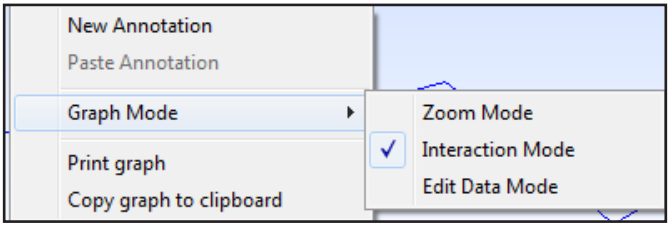
The active mode is indicated in the lower left corner of the screen.



Clicking on the Zoom In button will toggle the mode between Normal and Zoom.

Clicking on the Edit button will toggle the mode between Normal and Edit.

The mode can also be selected by right clicking on the display area and utilizing the menus shown below.

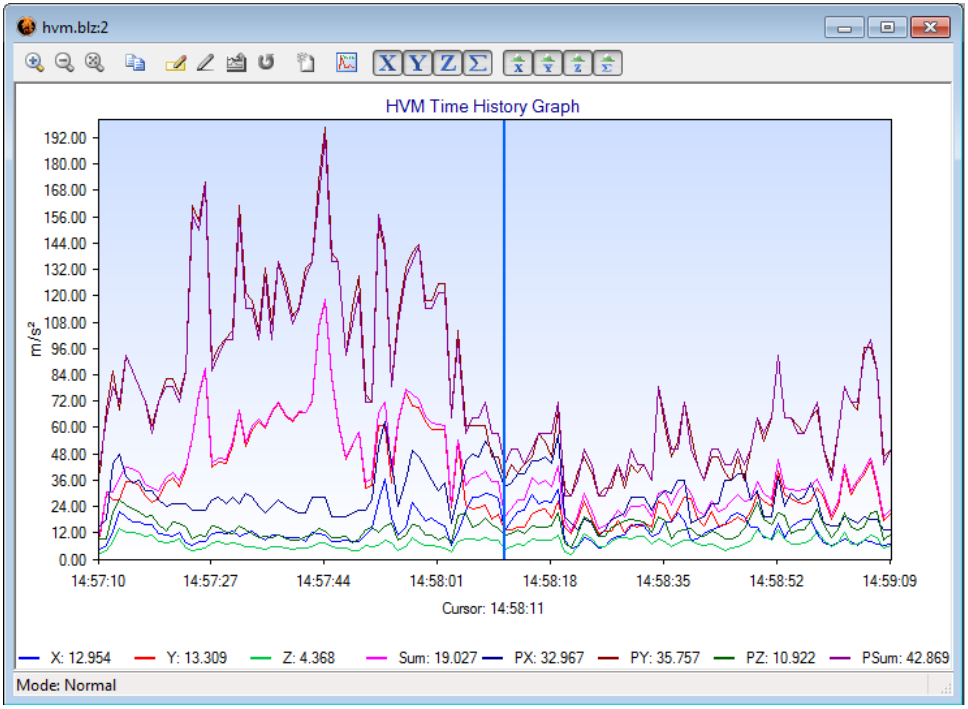


To move the cursor to another location, click a new point on the graph or use the left/right arrow keys on the keyboard.

Normal (Interactive) Mode

Amplitude Display

To display the amplitude of each curve at a selected position on the graph, click on the graph to produce a cursor. The amplitude values will appear in the legend below the graph.



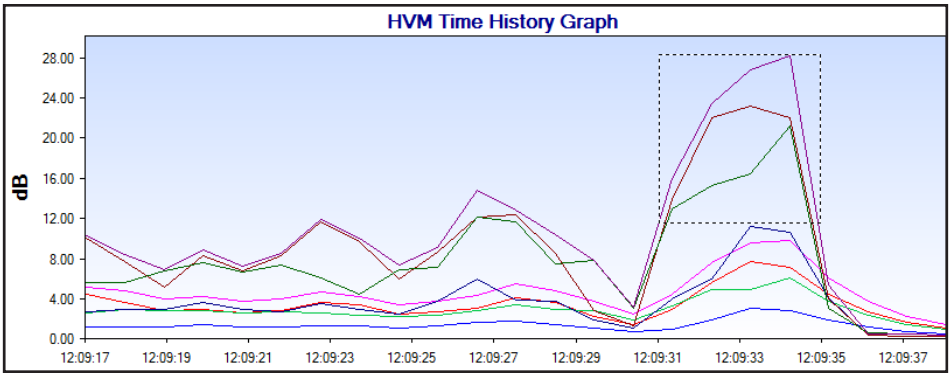
To move the cursor to another location, click a new point on the graph or use the left/right arrow keys on the keyboard.

Zoom Mode

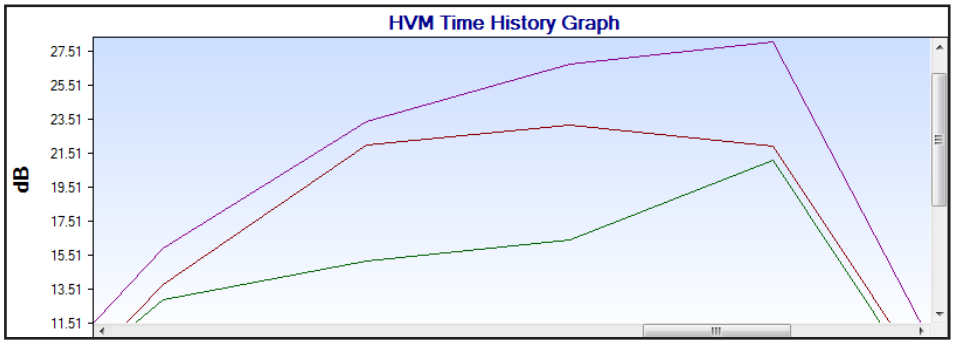
Zoom In

Step 1 Click the Zoom In button on the Time History toolbar.

Step 2 At a desirable place within the Time History graph, click and hold down the left mouse button and draw a box around the desired zoom location.



Step 3 Release the left mouse button to execute the zoom.



Note that the Zoom icon is still highlighted, meaning that further zooming can be achieved on the zoomed time history presently displayed by repeating the above procedure. In order to utilize the mouse to control the cursor function in the display, turn off the zoom function while retaining the zoomed display by clicking the Zoom In icon one more time so that it is no longer highlighted. Or, use the arrow keys rather than the mouse to move the cursor.

Zoom Out/Zoom to Original

When the zoom function has been utilized, Zoom Out

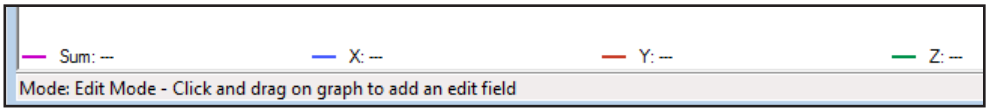
will return the graph to that displayed prior to the most recent zoom action. When the display is the result of a sequence of zoom actions, repeated use of Zoom Out will produce displays associated with each of the prior displays.

To return a zoomed display to its original display, regardless of the number of zoom actions utilized, click the Zoom to Original icon.

Edit Mode

Select the Edit Mode by clicking the Edit icon from the toolbar

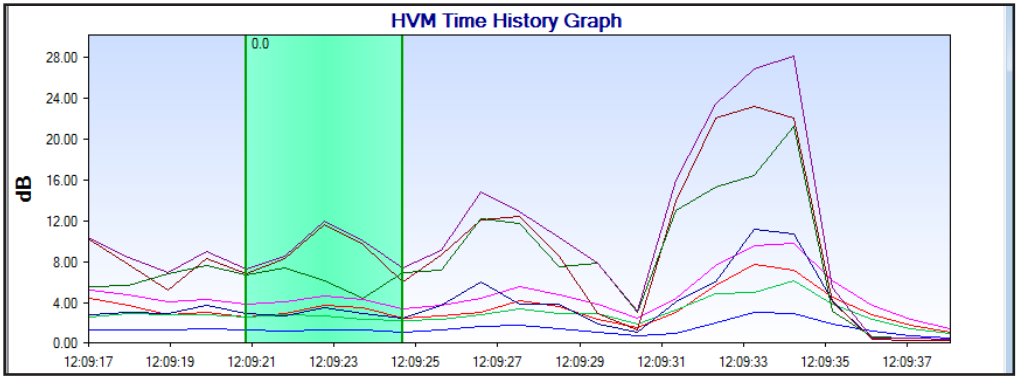
A note in the lower left corner will show that the Edit Mode is active.



Selecting a Data Block

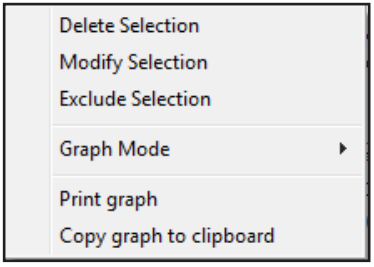
The data block to be edited is selected by depressing the left mouse button over a point on the graph, sliding the mouse left or right, and then releasing the button.

The selected band can be moved left or right using the left/right arrow keys on the keyboard. The left or right edges of the band can be moved left or right by depressing the left mouse button, sliding it right or left, releasing the button and then clicking within the adjusted band.

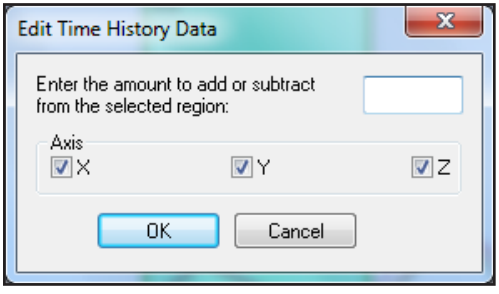


Edit Data

This option is used to add or subtract an equal amplitude value, in units of m/s^2, from all data points within the band. Right click over the band to open the menu shown below and click Modify Selection.



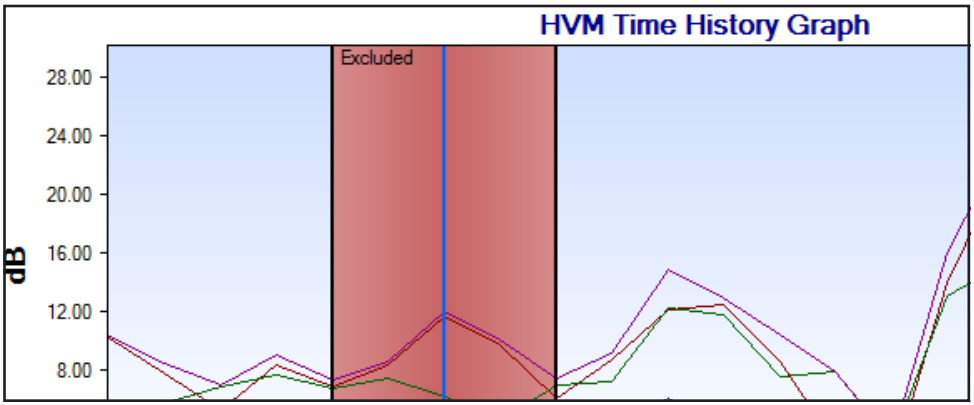
This will open the Edit Time History Data dialog.



Enter a numerical value and select to which axis, or axes, the modification is to be applied and click OK

Exclude Data

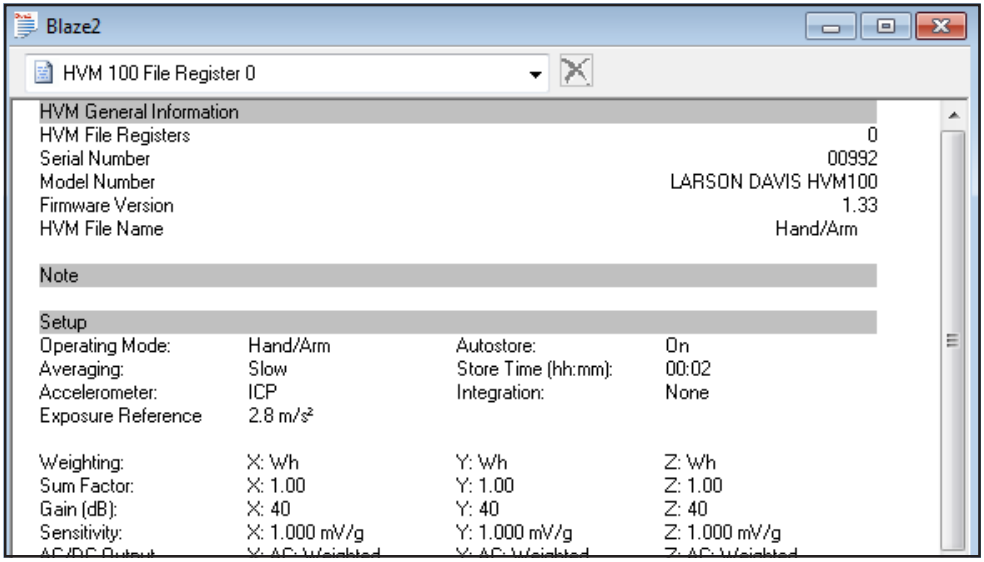
Exclusion removes the data points within the selected range from the overall calculations.



Creating New Record

To create a new record from the currently selected edited record, click the Create New Record button.

This will generate a new data record like the one shown below.



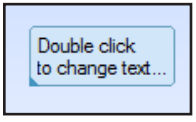
Restore Data

To delete all edit fields and restore data to original values, click the Restore Data button.

Annotating Graph

Multiple notes can be added to the graph, one note at a time. To add a note to a graph, click the **Add Note** icon on the graphic toolbar.

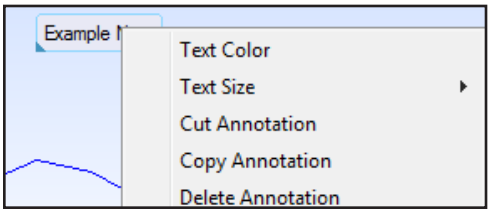
Place the mouse pointer where you would like to have the Note Box located on the graph and left click.



Double click within the box and type the desired text.

Edit Note

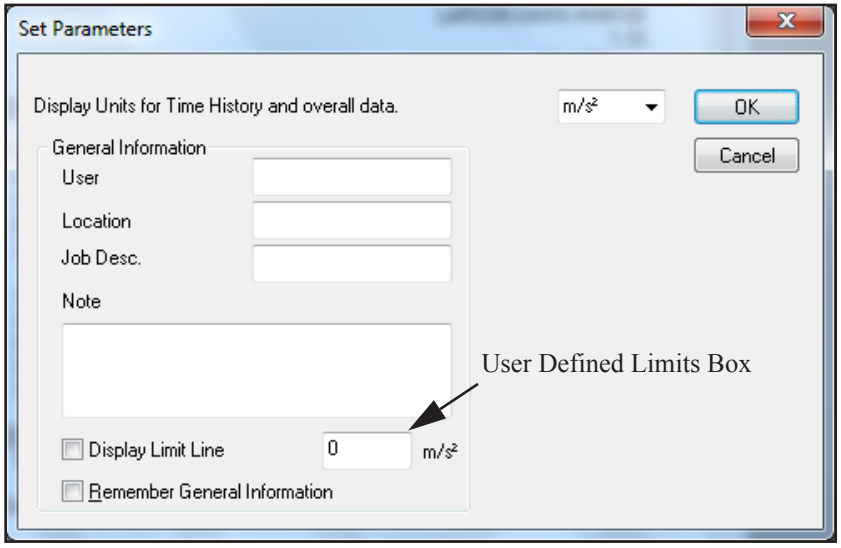
To edit or delete the note, right click on the note box to open the menu shown below.



Setting a Reference Line in a Time History Graph

Blaze allows the user to define a limit line that will appear on the Time History Graph, the Summary Report time history graph, and the Time History Detail Report graph. The limit must be set for each record. This action is performed using the Set Parameters Menu.

Step 1 Click the **Set Record Parameters** icon on the toolbar or click **Records/Set Parameters**.

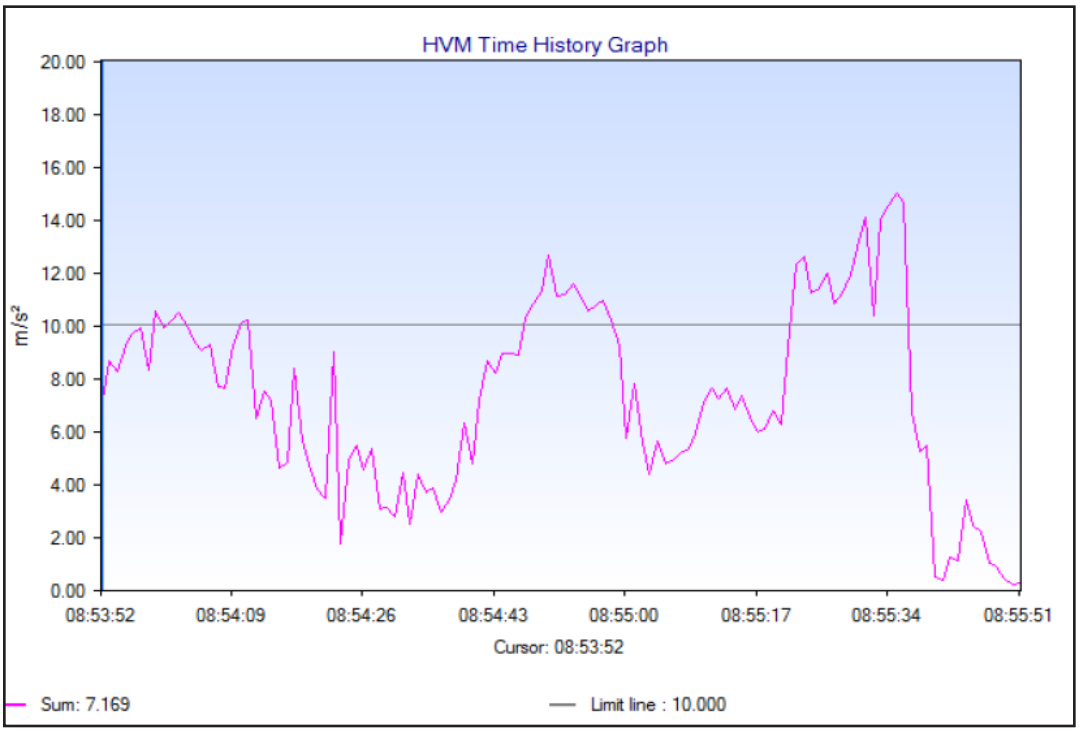


Step 2 Select units from the list provided.

Step 3 Enter a value in the User defined Limit box.

Step 4 Click Display Limit Line box to display limit line on graph, and click **OK**.

A horizontal line corresponding to the limit line value will now appear when a Time History graph is created.



CHAPTER

6 Report Generation

To improve efficiency in documenting the results of measurements, Blaze provides routines to generate and print Summary and Time History Reports.

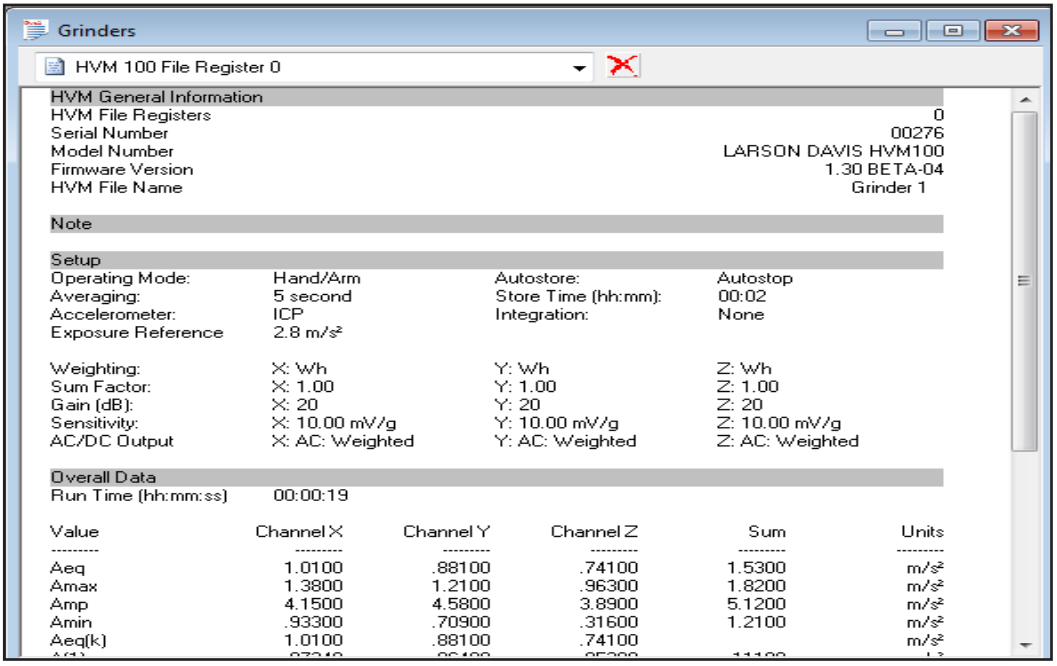
Summary and Time History Detail Reports

The Summary Report is a one-page report that prints instrument setup information, measurement results and a time history graph (if desired) that is condensed to fit the page.

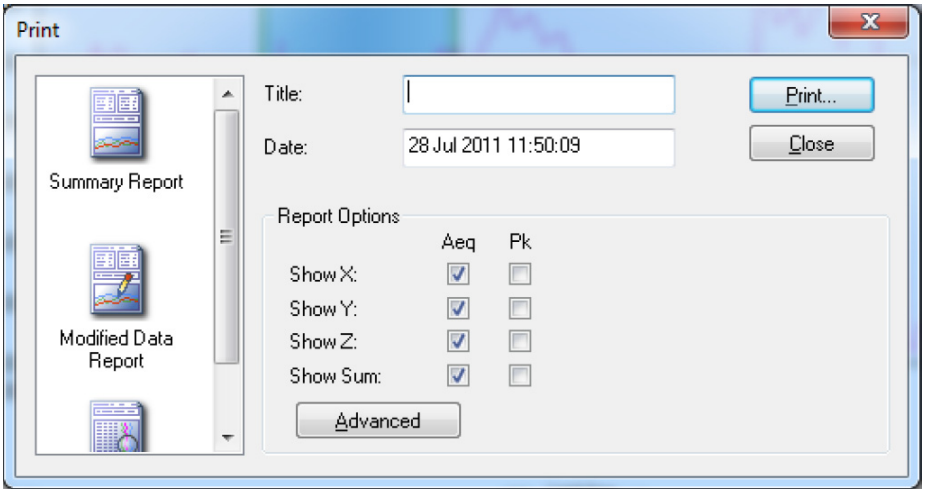
The Time History Detail Report provides instrument setup information and a tabular presentation of all time history data accompanied by a bar chart graphic.

Printing the Reports

Step 1 Display the measurement record you wish to print.



Step 2 Click the **Print Reports** icon on the toolbar or click **File/Print Reports**.



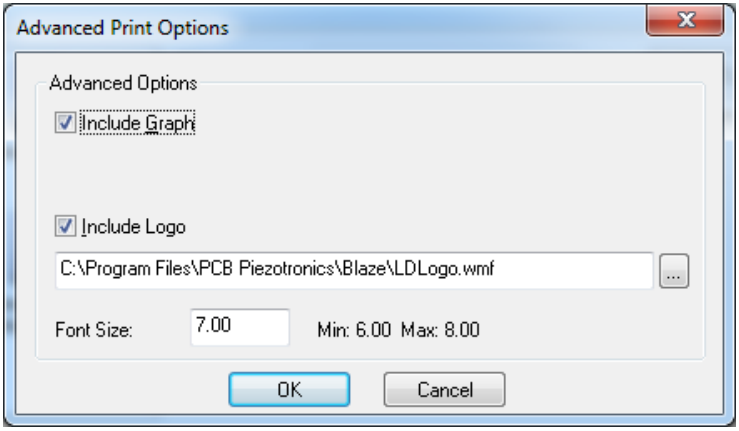
Step 3 Select the desired report by clicking the corresponding icon in the window on the left. This will highlight that icon and enter a default title for the report as shown below.

Note: If the measurement does not include peak levels, the four option boxes used to select peak values will not appear.

Step 4 You can now click **Print** to print the report immediately or click **Advanced** to access additional selections provided in the Advanced Print Options prior to printing the report.

Advanced Print Options

From the Print dialog box click **Advanced** to open the Advanced Print Options dialog box.



After the selections have been made, press **OK** to return to the Print dialog box and press **Print.**

Printing Displayed Measurement Summary

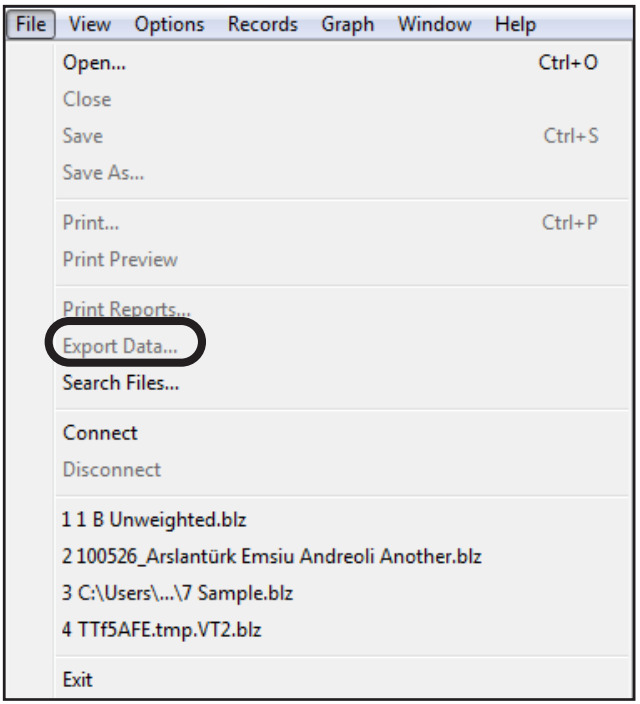
You can print a displayed Measurement Summary report or Time History Graph by clicking the **Print** icon on the toolbar (or clicking **File/Print**).

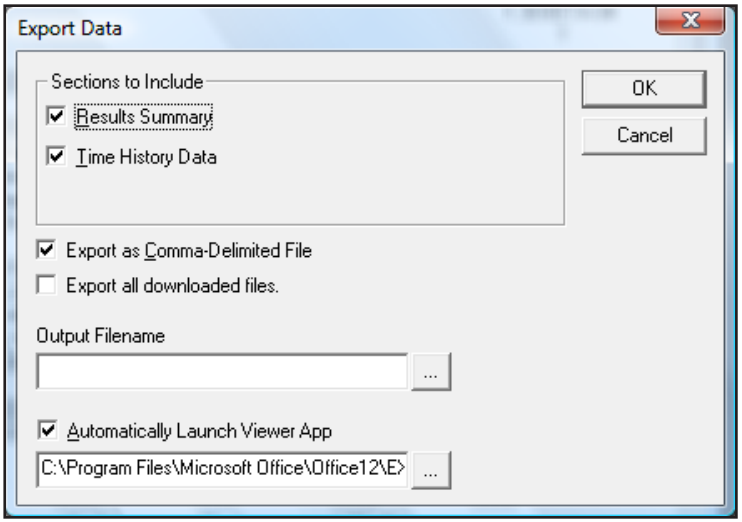
Exporting Record Data

Measurement records can be exported to text files, which can be exported to another program such as a spreadsheet for further processing and for use in a report.

Step 1 Display the measurement record you want to export.

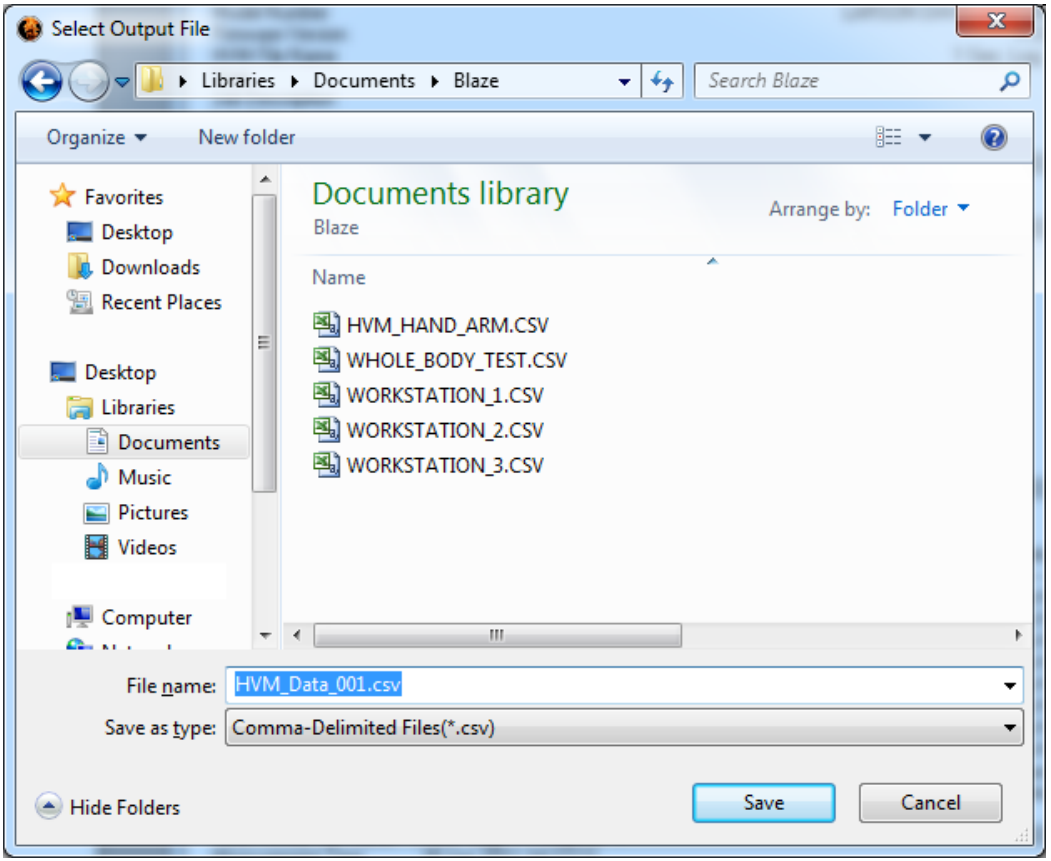
Step 2 Click the Export Data icon on the toolbar or click **File/Export Data** to display the Export Data dialog box.


File
View
Options
Records
Graph
Window
Help
Open... Ctrl+O
Close
Save Ctrl+S
Save As...
Print... Ctrl+P
Print Preview
Print Reports...
Export Data...
Search Files...
Connect
Disconnect
1 1 B Unweighted.blz
2 100526_Arslantürk Emsiu Andreoli Another.blz
3 C:\Users\...\7 Sample.blz
4 TTf5AFE.tmp.VT2.blz
Exit


Export Data
Sections to Include
Results Summary
Time History Data
OK
Cancel
Export as Comma-Delimited File
Export all downloaded files.
Output Filename
...
Automatically Launch Viewer App
C:\Program Files\Microsoft Office\Office12\E
...

Check the appropriate boxes, and select the output file name, then press save.

Selecting “Export all downloaded files” will export all downloaded files to separate .csv or .txt files at the same time. These will be stored to the file name defined in step 3 with _001, _002, etc. appended sequentially to that file name.



Step 3 Press **Save** to return to the Export Data dialog box where the newly defined file name will appear in the Output Filename field and press **OK** to perform the export operation.

The text file(s) have been created and reside in the Windows directory you selected.

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