

Dash “HF” Family High Speed Data Acquisition Recorder



QUICK START GUIDE

- (1) Introduction***
- (2) Getting Started***
- (3) Hardware Overview***
- (4) Menus & Icons***
- (5) Using the Dash “HF”***
- (6) Setting Up the Display Appearance***
- (7) Amplifier Settings***
- (8) Sample Exercises***
- (9) Archiving Data Records***
- (10) Entering Engineering Units***
- (11) Powering Down***

Astro-Med, Incorporated: Test & Measurement Product Group
Astro-Med Industrial Park, 600 East Greenwich Ave., West Warwick, RI 02893
Toll-Free Phone: 877-867-9783 Phone: Fax: 401-822-2430
email: mtgroup@astromed.com

Part # 22834564 Version 1.3

1. INTRODUCTION

Thank you for choosing an Astro-Med data acquisition recorder. This Quick Start Guide was prepared to help you become acquainted with your recorder as quickly as possible. We even include sample exercises so you can become familiar with the basic operation.

This Quick Start Guide supports the following models: Dash 8HF, Dash 8HF-HS, Dash 20HF, Dash 20HF-HS, Dash 32HF, Dash 32HF-HS. Throughout this guide, all models are referred to as **Dash “HF”**.

The **Dash “HF”** is a powerful and versatile data acquisition recording system that provides the capability to display, record, and review waveform data.

Data samples can be acquired at rates listed in table 1 and streamed directly to a high-capacity 250 GB hard drive.

MODEL	ANALOG INPUT CHANNELS	TTL INPUT EVENTS	MAXIMUM SAMPLE RATE PER CHANNEL	ANALOG BANDWIDTH PER CHANNEL
Dash 8HF Dash 8HF-HS	8 Isolated - 250 Vrms	8 (0 - 5 V TTL)	2,000,000 samples/second per channel (2 MHz per channel)	200 kHz (-3db)
Dash 20HF Dash 20HF-HS	4 Isolated - 250 Vrms (Channels 1-4) 16 Non-Isolated Differential - 35 Vrms (Channels 5-20)	8 (0 - 5 V TTL)	500,000 samples/second per channel (500 kHz per channel)	100 kHz (-3db)
Dash 32HF Dash 32HF-HS	32 Non-Isolated Differential - 35 Vrms (Channels 1-32)	8 (0 - 5 V TTL)	500,000 samples/second per channel (500 kHz per channel)	100 kHz (-3db)

Table 1: Dash “HF” Family Key Specifications

The **Dash “HF”** utilizes a touch-screen as the main user interface. Many of the **Dash “HF”** control icons are customizable, providing the capability to modify the display based on the needs of the user or application.

2. GETTING STARTED

Voltage Verification: The **Dash “HF”** has an auto-sensing power supply that operates from 100 – 264 VAC at 50 or 60 Hz. You do not have to set up any fuse block arrangement.

Connect AC Power Cord: Connect AC power cord to the side panel, then to an outlet.

Turn On the Dash “HF”: When you turn on the **Dash “HF”**, the display will show various initialization screens and then load in the last setup it had before it was powered down.

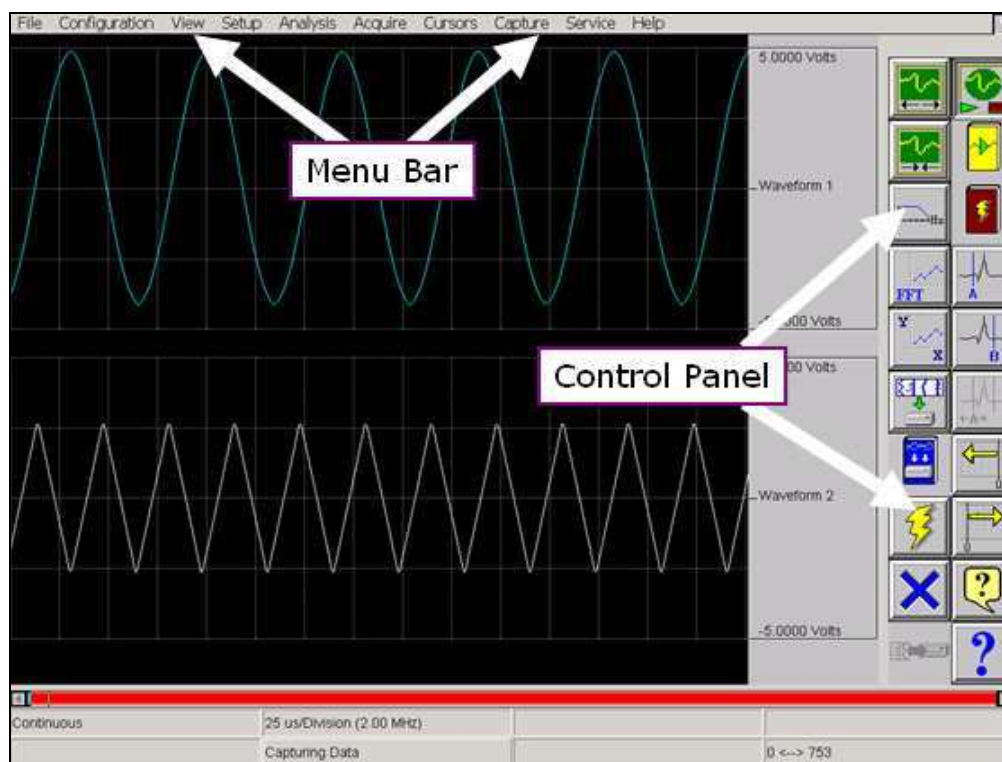
Display: The **Dash “HF”** has a large 15” touchscreen display. The display is divided into two main areas, the Waveform Display Area (shows the waveform signals typically drawn onto a grid pattern) and the Control Panel (rows of control icons for operation).

3. HARDWARE OVERVIEW

The following is a summary of the location of the physical components of the **Dash “HF”**.

Front View:	Touch Screen, Carry Handle
Left Side View:	Signal inputs (Please see table 1 above), Computer connections (2 USB ports, 1000BaseT Ethernet port, Mouse/Keyboard port, VGA port, Utility port, Recorder port (Recorder support for model SCR-8 active on Dash 8HF model only), Link ports, Event port
Right Side View:	Power indicator light, Power switch, Power inlet, DVD (High security models have removable, lockable drives in place of the DVD)
Back Side View	Unit Stand

4. MENUS & ICONS



Dash "HF" screen highlighting the Menu Bar and Control Panel

MENU BAR

The menu bar is a group of drop-down menus located across the top of the display. All **Dash "HF"** modes and features can be accessed from this menu. Options available from the menu bar will vary based on the mode of operation (Scope, Realtime or Review) used.

If the date and time are visible instead of the menu bar, choose the **M** icon in the upper right hand corner, which toggles the display of date/time and menu bar.

File - Configuration - View - Setup - Analysis - Acquire - Cursors - Capture - Service - Help

Dash "HF" Menu Bar

File	The File menu is used to save and load your setup files.
Configuration	The Configuration menu is used to select the operation of the Dash "HF".
View	The View menu is used to supplement the graph display of your signals.
Setup	The Setup menu is used to configure the Dash "HF".
Cursors	The Cursors menu is used for time and amplitude measurements.
Capture	The Capture menu is used to setup, arm, manual trigger, and abort data captures.
Service	The Service menu is for less frequently used parameters such as calibration and security settings.
Chart	(Not Shown above) Chart is for the use of the SCR-8 chart recorder with the Dash 8HF model only.
Help	The Help menu provides access to the operations manual.

CONTROL PANEL

The control panel is an array of icon-based icons located on the right hand side of the display. The icon icons allow for a single touch to execute a function. The **Dash "HF"** ships with the control panel displaying icon icons for speed control, analog set up, meter mode, and run/halt.

The control panel can be customized (as shown above) to add or remove icon icons to suit your recording needs. Further, the control panel settings can be saved to a file for later recall making test preparation very easy.

5. USING THE Dash “HF”

The Dash “HF” has three modes of operation, Scope, Realtime, and Review modes.

Scope Mode: Scope mode acts like a digital storage oscilloscope, providing high time-base resolution for viewing high frequency signals and provides waveform scrolling, monitoring, and data capture capabilities. Scope mode is the default mode of the *Dash “HF”*.

Realtime Mode: Realtime mode emulates a chart recorder and provides real-time waveform scrolling, monitoring, and data capture capabilities.

Review Mode: Review mode provides the capability to review and analyze saved data captures and scope captures.

Help: Within the *Dash “HF”*, three forms of help are available:

Context Help The context help feature provides context sensitive, on-screen help.



Icon Help The icon help feature provides on-screen help for the icons. A brief description of the selected icon is provided.



Online Manual The Adobe Portable Document Format (PDF) version of the manual is available in the *Dash “HF”* for on-screen viewing. This softcopy manual can be viewed on the *Dash “HF”* from Scope, Realtime or Review mode by selecting **Help>>On-Line Help** from the drop-down menu.



6. SETTING UP THE DISPLAY APPEARANCE

The *Dash “HF”* gives you total control over the display layout. You can set individual channel widths, channel location, grids ON/OFF, and major/minor division sizing. You are also able to suppress or enable waveform display as well as vary the waveform trace thickness. Further, you can overlap some or all of the channels.

Basic Channel Views: The *Dash “HF”* provides basic channel views that you can access from the menu bar. These views allow you to choose a fixed number of channels to display.

Custom Channel Views: If you do not find a view from the Basic Channel Views described above, you can use the Chart / Display wizard. The wizard allows you to pick the number of channels to display. You can further customize your chart by overlapping or resizing the channels. You can also add, remove, or replace channels.

7. AMPLIFIER SETTINGS

Each channel type (isolated or differential non-isolated) have unique amplifier settings. Amplifier settings allow the user to set the span for the channel, also adjust the zero volt position. For convenience, amplifier settings can be copied to other channels. Further, user scaling is supported on the *Dash “HF”* units so that your channels can report their values to you in Engineering Units.

8. SAMPLE EXERCISES

Scope Mode Exercise #1: 10 kHz Signal Monitoring and Recording

Scope mode acts like a digital storage oscilloscope, providing high time-base resolution for viewing high frequency signals and provides waveform scrolling, monitoring, and data capture capabilities.

In the following hands-on exercise, you will set up a channel to monitor a 10 kHz sine wave in Scope mode. Next, a Scope screen capture and data capture will be set up to record when the signal changes voltage amplitude. Finally, the scope capture and data captured data will be reviewed.

In the exercise, every action needed is detailed in a step-by-step fashion to help you quickly become familiar with the operation of the Dash "HF" Scope mode. The **ACTION** on the left-hand side describes what is to be done. The **HOW TO** section provides the detailed steps to take using the pull-down menus of the Menu Bar.

I. Scope Mode Monitoring: Monitor a 10 kHz 5V pk-pk sine wave

Items needed: Signal Generator, Signal input leads, Female Banana to Male BNC connector (Required for the Dash 32HF only).

ACTION	HOW TO (Use the Menu Bar Pull-Down menus)
--------	---

Verify Menu Bar display	If the date and time are visible at the top of the screen, press the M icon in the upper right hand corner to show the Menu Bar.
-------------------------	---

File - Configuration - View - Setup - Analysis - Acquire - Cursors - Capture - Service - Help	
---	--

Dash "HF" Scope Mode Menu Bar

Default the Dash "HF"	Choose Configuration >> Utilities from the menu bar to open the Utilities window. Choose Defaults >> System from the menu bar to set the recorder to factory defaults. Click Yes to accept.
Enter Scope Mode	Choose Configuration >> Scope from the menu bar to enter Realtime Mode.
View Channel 1	Choose View >> 1 Channel from the menu bar.
Set Scope Screen to View Signals	Choose Acquire >> Settings , the Scope Settings window will appear.
Set Scope Capture Size	Slide the Scope Capture Size slide bar all the way to the right. The Scope Capture Size slide bar is located at the top of the Scope Settings window. This sets the amount of samples per channel that stream to the scope memory and screen for viewing.
Turn off unused channels	To turn off unused channels in the Scope Settings select the " Select All " icon this will select all of the waveforms in the Scope Channel Selection section located in the bottom left corner of the Scope Settings window. Deselect Waveform 1 , which is set to On . All channels should be highlighted with the exception of Waveform 1 . Click the Status menu bar and select Off . The status of Waveform 1 should be On while the remaining Waveforms and Events should have a status of Off .
Adjust Scope Capture Size	Note how the Scope Capture Size slide bar at the top of the Scope Settings window moved to the left when you turned off the additional channels. Because the additional waveforms were turned off, there is now more Scope memory available for Waveform 1 . Move the Scope Capture Size slide bar all the way to the right.



Select All Icon

Continued...

Select Scope Capture Type

Select the **Continuous** icon in the **Scope Capture Type** section of the **Scope Settings** window. The **Continuous** icon will have a check mark in it when selected. Press the **OK** icon located in the lower right hand corner of the **Scope Settings** window.



Dash “HF” Scope Settings Window

Start Scope Capture to the Screen

Choose **Acquire >> Arm/Abort**, to continuously capture data to the **Scope Mode** screen. There should be a check mark to the left of the Arm/Abort selection. You can also use the Arm/Abort icon located on the control panel at the top right of the Scope mode screen.

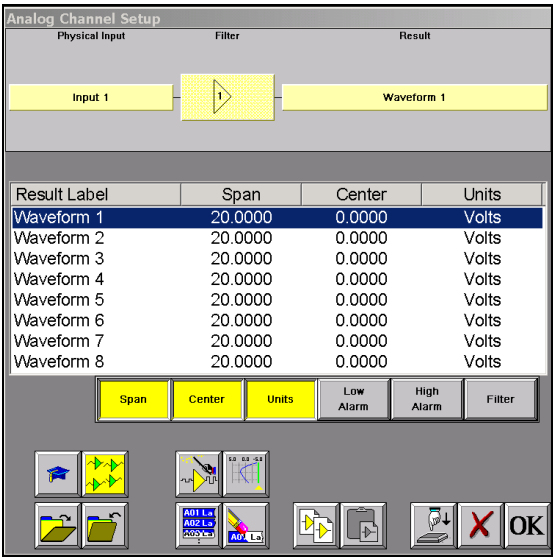


Scope Arm/Abort Icon

Set time per division and sample rate to screen

Choose **Acquire >> 50us/Division**. This will set the time per division and sample rate of the data streaming to the scope screen. The 50uS/Division corresponds to a 1 MHz sample rate on the Dash 8HF and a 500 kHz sample rate on the Dash 20HF and Dash 32HF. The time per division and corresponding sample rate can be viewed on the bottom of the screen above the capturing data indicator. The **Dash “HF”** system is now capturing data to the screen.

Set Channel #1 to be 10 Volts Full Scale with 0 Volts as the span center



Dash “HF” Amplifier Channel Settings (Analog Channel Setup) Window

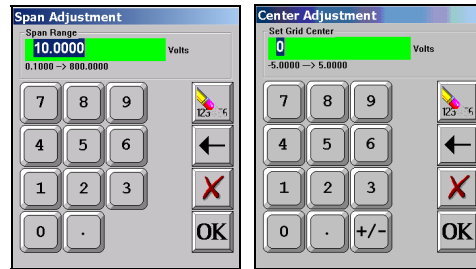
Continued...

Set Waveform 1

Choose **Setup >> Amplifier Channel Settings (Analog Channel Setup)** from the menu bar. You can also use the **Amplifier Settings** icon located on the control panel at the top right of the Scope mode screen. The Amplifier Channel Settings window will appear. Highlight **Waveform 1**.



Amplifier Setup
Icon



Span and Center adjustment keypads

Set Span for Waveform 1

Press the **Span** column. The Span Adjustment box will appear. Press the digit “1” and “0” to select 10. Press **OK** on the Span Adjustment box.



Set Center for Waveform 1

Press the **Center** column. The Center Adjustment box will appear. Press the digit “0” to select 0. Press **OK** on the Center Adjustment box. Press **OK** on the **Amplifier Channel Settings (Analog Channel Setup)** Window.



Input 10 kHz sine wave signal into Channel #1

Use the banana jack input connection located on the side of the Dash 8HF and Dash 20HF and input the signal into Channel #1. Channel 1 on the Dash 32HF is a differential channel. Use the D-Shell to BNC adaptor that came with the unit. You will need a female Banana to Male BNC connector to interface the signal leads to the D-Shell to BNC interface. Turn on the generator. Set the generator for a 10 kHz sine wave.

Set sine wave amplitude

Choose **Cursors >> Show Cursor A** from the menu bar. **Cursor A** should appear. Do the same for **Cursor B**. You can also use the **Cursor A and B** icons located on the Control panel to toggle the cursors on and off. Drag **Cursor A** to the left side of the screen and then drag **Cursor B** to the right side of the screen.



Cursor A and B
Icons

View Show Channel Information

Choose **View >> Show Channel Information** from the menu bar to activate the cursor measurements. The **Channel Information** window will appear. Select the bottom right hand corner of the **Channel Information** window to resize.

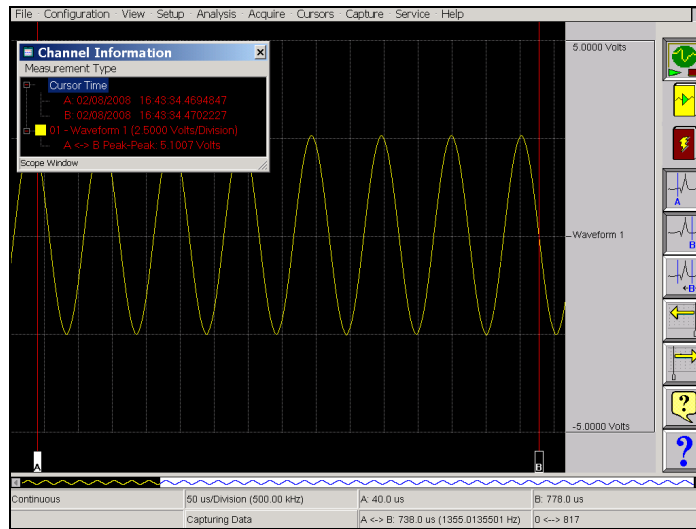
Choose Show Channel Information Measurement Type

On the **Channel Information** window, choose **Measurement Type >> Peak-Peak**. The **Channel Information** window should now display **Peak-Peak** voltage.

Adjust Generator Amplitude

Using the **Peak-Peak** measurement type on the **Channel Information** window, adjust the amplitude on your generator to 5V peak-peak. Using the offset adjustment on your generator, center the waveform on zero.

Continued...



Peak to Peak Measurement using Cursors and the Channel Information Window

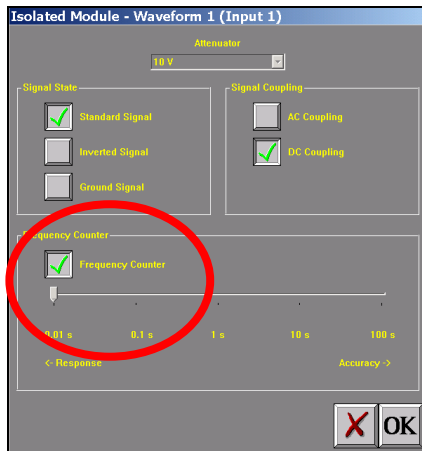
Check the signal Frequency

Choose **Setup >> Amplifier Channel Settings (Analog Channel Setup)** from the menu bar, press the **Advanced Setup** (graduation hat) icon located in the first row of icons on the bottom left hand corner of the **Amplifier Channel Settings (Analog Channel Setup)** window. This will open the analog channel advanced settings window.

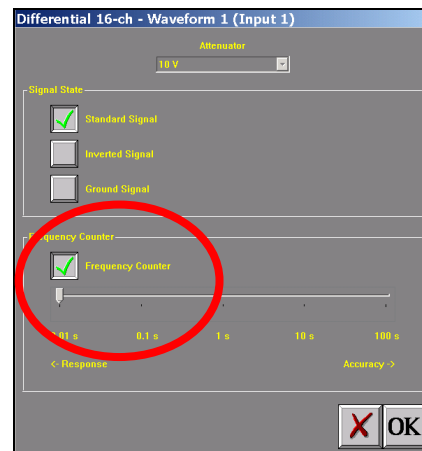


Advanced Amplifier Setup Icon

Note: The Dash 8HF has hardware frequency counters on Channels 1 and 5; the Dash 20HF has hardware frequency counters on Channels 1 and 5. The Dash 32 has hardware frequency counters on Channels 1 and 17.



Dash 8HF & Dash 20HF Channel 1 Advanced Settings



Dash 32HF Channel 1 Advanced Settings

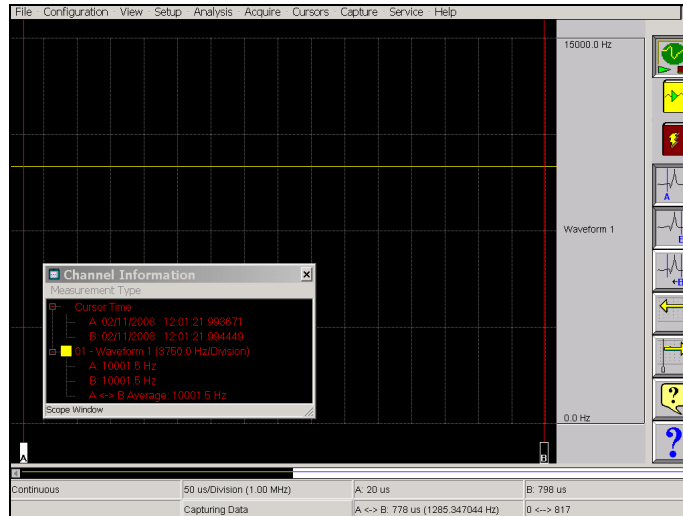
Set Frequency Counter

Select the **Frequency Counter** icon. The icon will be checked when selected. Slide the **Frequency Counter Response vs. Accuracy** slide bar located under the **Frequency Counter** icon, all the way to the left. Press **OK** on the Advanced Amplifier Setup window. The **Amplifier Channel Settings (Analog Channel Setup)** window should still be open. On the **Amplifier Channel Settings (Analog Channel Setup)**, highlight **Waveform 1**. Select **Span** and enter **15000**. Press **OK** on the **Span Adjustment** keypad and then press **OK** on the **Amplifier Channel Settings (Analog Channel Setup)** window.

Continued...

Measure Signal Frequency

You should now see a straight line frequency measurement. Choose **Measurement Type >> Average** on the **Channel Information** window. The frequency measurement is displayed in the **Channel Information** window.



Dash "HF" Frequency Counter Measurement

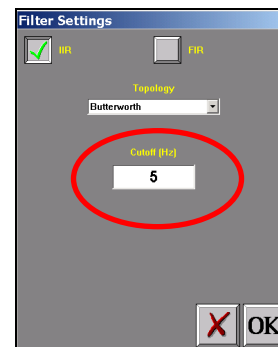
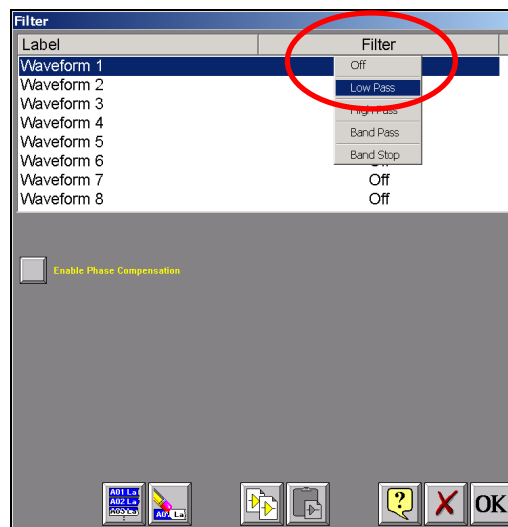
Turn off the Frequency Counter

Choose **Setup >> Amplifier Channel Settings (Analog Channel Setup)** from the menu bar, press the **Advanced Setup** (graduation hat) icon located in the first row of icons on the bottom left hand corner of the **Amplifier Channel Settings (Analog Channel Setup)** window. This will open the advanced settings window.

Deselect the **Frequency Counter** icon. Press **OK** on the Advanced Amplifier Setup window. Press **OK** on the **Span Adjustment** keypad and then press **OK** on the **Amplifier Channel Settings (Analog Channel Setup)** window.

Filter the Signal Frequency

Choose **Analysis >> Filters** from the menu bar. Highlight **Waveform 1** on the **Filter** window. On the **Filter** settings Select **Filter >> Low Pass**. The Filter Settings window will appear. Press the **Cutoff (Hz)** box and a keypad will appear. Enter **5** and press **OK** on the **Filter Settings** window. Press **OK** on the **Filter** window. A straight line 0 V signal is now displayed on the screen. The 10 kHz signal is now filtered using a 5Hz low pass filter on the screen.



Dash "HF" Filter and Filter Settings Windows

Continued...

- Turn off the Filter** Choose **Analysis >> Filters** from the menu bar. Highlight **Waveform 1** on the **Filter** window. On the **Filter** settings Select **Filter >> Off**. Press **OK** on the Filter window. The 10 kHz sine wave will now be on the **Dash "HF"** screen.
- Close Channel Information window** Close the **Channel Information** window by pressing the **X** in the top right hand corner of the **Channel Information** window.
- Turn Off Cursor A and B** Choose **Cursors >> Show Cursor A** from the menu bar. **Cursor A** should appear. Do the same for **Cursor B**. You can also use the cursor A and B icons located on the Control panel to toggle the cursors on and off.
- Turn Off Signal Generator** Turn off the signal generator. Keep the generator connected to the unit.

This concludes the Scope Mode Monitoring portion of this sample exercise. Please keep your setup for the next section of this exercise.

II. Scope Mode Capture: Capture a 10 kHz 5V pk-pk sine wave to the Scope Screen

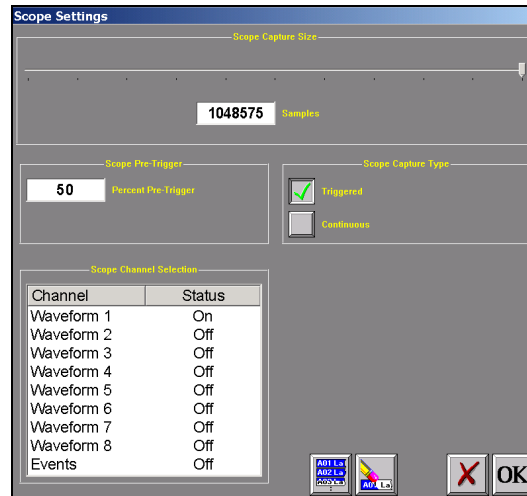
We will now set a trigger so that when the 10 kHz 5V pk-pk signal is applied. The unit will trigger and capture the event to the scope screen. This is an example of a transient snapshot data capture. The signal generator setup and **Amplifier Channel Settings (Analog Channel Setup)** from part I of this exercise will be used.

ACTION

Turn On Scope Capture Triggering

HOW TO (Use the Menu Bar Pull-Down menus)

Choose **Acquire >> Settings**, the **Scope Settings** window will appear. Under the **Scope Capture Type**, Select the **Triggered** Icon. The **Triggered Icon** should be checked. Deselect the **Continuous** Icon that was set in section I of this exercise.



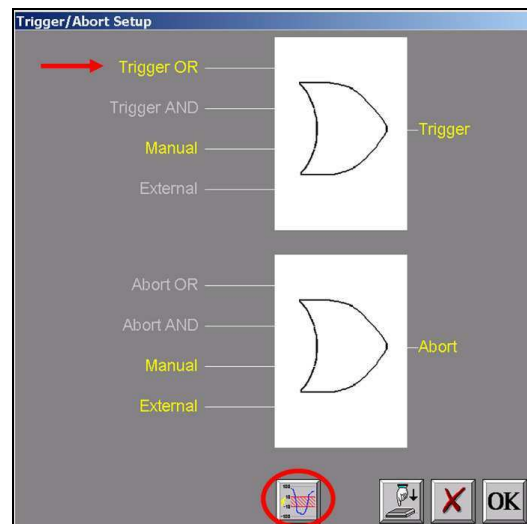
Scope Capture Settings Screen

Set Scope Capture Pre-Trigger

Under the **Scope Pre-Trigger** section select the **Percent Pre-Trigger** box and input **50** into the **Enter Percent Pre-Trigger** keypad. Your **Scope Settings** Screen should now look like the example above. Press **OK** on the **Scope Settings** window.

Enter Trigger Settings

Choose **Setup >> Trigger Settings** from the menu bar to open the **Trigger/Abort Setup** window.

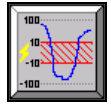


Trigger/Abort Setup Menu

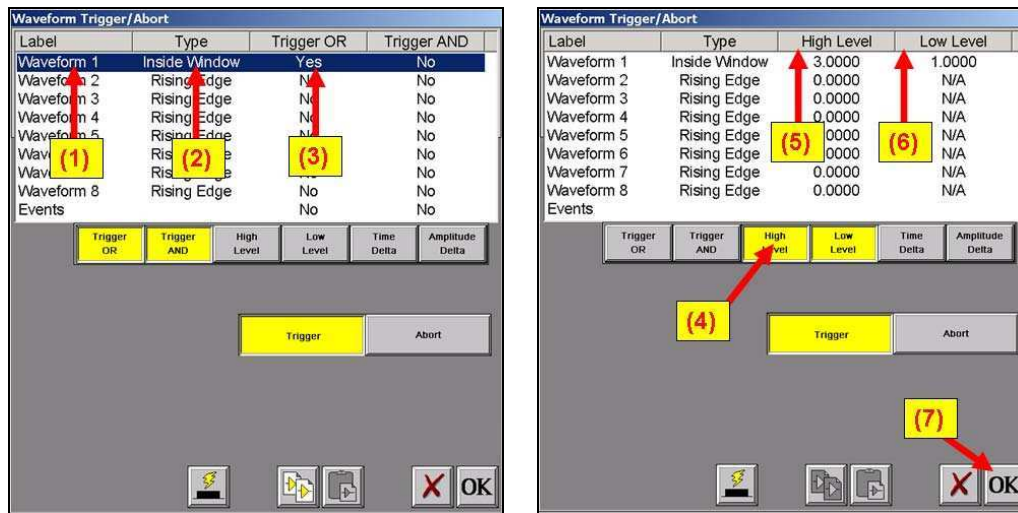
Continued...

Set Software Trigger

Press **Trigger OR** to highlight in yellow. Since we reset the system defaults at the beginning of this exercise, the **Manual Trigger** input and **Trigger** output will be highlighted. Press the **Trigger Level** icon (1ST icon in the row of icons at the bottom) to open the **Waveform Trigger** settings menu.



Trigger Level Icon



Trigger Type Menus

- (1) In the **Waveform Trigger** window, highlight **Waveform 1**.
- (2) Press **Type**. Then select **Inside Window** from the **Type** pull down menu.
- (3) Press **Trigger OR**. Then select Yes. This will enable the **Trigger OR** trigger feature.
- (4) Under the Waveform Trigger window, there are six icons. Select the **High Level** icon to enable the High Level and Low Level settings columns.
- (5) Press the **High Level** pull down menu (Located to the right of the **Type** pull down menu) and enter "3" in the **Set Level** keypad. Press **OK**.
- (6) Press the Low Level pull down menu and enter "1" in the **Set Level** keypad. Press **OK**.
- (7) Press **OK** at the lower right hand corner of the menu.
You have just set the trigger to be asserted when the input signal enters the voltage threshold between 1 and 3 volts. Since our generator signal is 5V peak-peak (2.5V peak) the scope capture will trigger once the signal is applied.

Set Dash "HF" to trigger when the 10 kHz, 5V pk-pk signal is applied.

Arm the Scope Capture

Select **Acquire>>Arm/Abort** or select the **Arm/Abort** icon located at the top right hand side of the **Dash "HF"** control panel. Once the scope capture is armed, the 50% pre-trigger will be captured. The system uses the scope memory as a circular buffer, waiting for the trigger to be activated.



Scope Arm/Abort Icon

Input Signal

Turn on the generator to input the 10 kHz, 5V peak-peak signal into Channel 1. This will activate the software trigger, send the pre and post scope capture data to the screen. Use the **Track View** bar at the bottom of the screen to move through the data on the **Scope** screen.

Continued...

Save Scope Screen Data to Disk

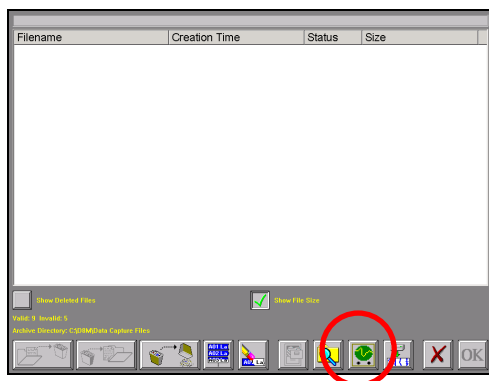
To save the Scope data, select **File >> Archive as Data Capture Record >> Entire File** on the pull down menu. The **Save Scope Capture File** screen will appear. Touch the blank space above **Filename** on the **Save Scope Capture File** screen. A keypad will appear. Enter the filename **Scope1**. Press **OK** on the keypad. Press **OK** on the **Save Scope Capture File** screen. The Scope Capture named **Scope1** is now saved.

Review Saved Scope Capture from Disk.

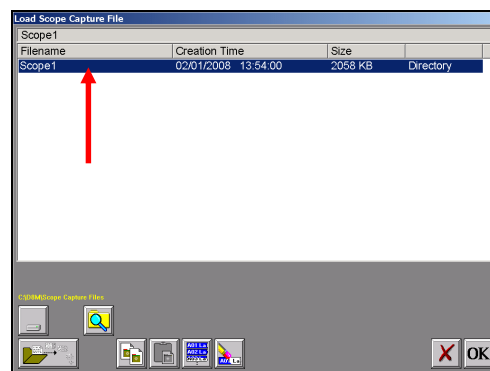
To open your Scope Capture for additional review, select **Configuration >> Review** from the pull down menu. The **Review** screen will open. Press the **Scope Capture Review Icon** (4th icon from the right on the bottom of the Review mode file screen). The **Load Scope Capture File** screen will appear. Highlight the file **Scope1** and press **OK**. The **Scope1** file is now loaded to the screen.



Scope Capture Review Icon



Review Mode Menu



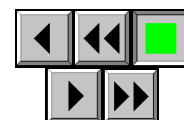
Scope Capture Review Menu

Expand the time base

Choose **Display >> Compression** from the menu bar. The **Compression** keypad will appear. Press the digit "1". Press **OK**.

Scroll through the data

Use **Scroll** icons. You can jog forward or backwards through the data. You can stop at any points of interest. Experiment scrolling forwards and backwards. Continue to scroll and stop the display when you have the trigger point (red vertical line) in the middle of the display.



Scroll Icons

Cursors

Press the **Cursor A** icon. Slide the cursor just to the left of the trigger point. Press the **Cursor B** icon. Slide the cursor just to the right of the trigger point.



Cursor A and B Icons

Time measurements using cursors

Choose **View >> Status Text Format >> Relative Time** from the menu bar. Observe the time values shown at the bottom.

Amplitude measurements using cursors

Choose **View >> Show Channel Information** from the menu bar. The **Channel Information** window will appear. Move **Cursor B** by sliding it to the right. As you move the cursor, observe the change in values in the **Channel Information** window.

Remove the cursors

Press the **Cursor A** icon and **Cursor B** icon to remove them.

Show entire capture

Choose **Display >> Show All File** from the menu bar to show entire capture. Note how 50% of the capture is before the trigger line. This corresponds to the 50% pre trigger setting we used in our Scope Capture setup.

This concludes the Scope Mode Capture portion of this sample exercise. Please keep your setup for the next section of this exercise.

III. Scope Mode Data Capture: Capture a 10 kHz 5V pk-pk sine wave to the Data Capture Drive

Using the trigger settings from the previous section, we will now set a trigger so that when the 10 kHz 5V pk-pk signal is applied the unit will trigger and capture the signal to the data capture drive. A 20-second data capture will be set and reviewed.

ACTION

Turn Off Scope Triggering from the previous section.

HOW TO (Use the Menu Bar Pull-Down menus)

Select **Configuration >> Scope** on the pull down menu to enter Scope mode. Choose **Acquire >> Settings**, the **Scope Settings** window will appear. In the **Scope Capture Type** section, deselect the **Triggered** icon. The **Triggered** icon should be **unchecked**. Select the **Continuous** icon, the continuous icon should now be checked. Press **OK**.

Set the Dash "HF" to stream data to the screen.

Select **Acquire>>Arm/Abort** or select the **Arm/Abort** icon located at the top right hand side of the **Dash "HF"** control panel.



Scope Arm/Abort Icon

Select capture of Channel 1

Select **Capture>>Capture Settings** from the pull down menu. The **Capture Setup** window will appear. Highlight **Waveform 1** by selecting it. Be sure the **Status** for **Waveform 1** is **On**. If not, click on the **Status** menu bar and select **On**.

Turn off capture of remaining channels

To reduce the size of our data capture, it is recommended that unused channels be turned off. This makes a more compact file that is easier to export out of the **Dash "HF"**.

To turn off unused channels in the **Capture Settings** select the **Select All** icon. Then deselect **Waveform 1**, which was set to **On** in the previous step. All waveforms and events should be highlighted with the exception of **Waveform 1**. Click the Status menu bar and select **Off**. The status of **Waveform 1** should be **On** while the remaining waveforms and events should have a status of **Off**.



Select All Icon

Set sample rate to 250 kHz

In the **Sample Rates (Hz)** section of the **Capture Setup** window box, press the down arrow and press **250,000**.

Set capture for 20 seconds

In the **Storage Allocation** section of the **Capture Setup** window, press the units pull-down box and select **Seconds**. (Other choices are *minutes, hours and Ksamples*). Press the value box located to the left of the units pull down menu to open the Seconds Window. Press the digits "2" and "0". Press **OK**.

Set trigger point at 25%

In the Storage Allocation box, press the **Percent Pre-trigger** box. Press the digits "2" and "5". Press **OK**. Be sure there is a green check mark next to the **Percent Pre-Trigger**.

Verify time of capture

Below the waveform selection window, in yellow text, the Record Duration should be 20 seconds; the Pre-Trigger Duration should be 5 seconds.

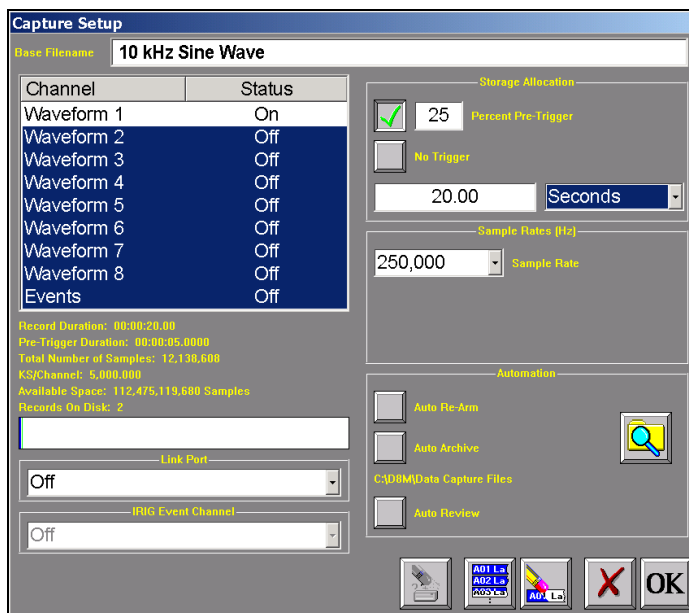
Set capture name

Press the **Base Filename** box, erase the name DCR and type **10 kHz Sine Wave**

Continued...

Set capture for one record

In the Automation Box, be sure that both the Auto Re-Arm & Auto Archive icons are **not** checked. *At this point, your Capture Setup Window should look like the image below.*



Capture Setup Window

Save and exit data Capture Setup window

Press **OK**.

Arm for capture

Choose **Capture >> Arm** from the menu bar to arm for capture. *The Capture Progress window pops up indicating status. The pre-trigger will be recorded.*

Turn On Generator with 10 kHz 5V pk-pk signal

A trigger should be produced and the capture continues to the end. While capturing, you should see the sine waveform for Channel #1 on the "Dash "HF"" screen.

Review Saved Data Capture from Disk.

To open your **10 kHz Sine Wave** data capture for additional review, select **Configuration >> Review** from the pull down menu. The **Review** screen will open. Highlight the file **10 kHz Sine Wave** and press **OK**. The **10 kHz Sine Wave** file is now loaded to the screen.

Show entire capture

Choose **Display >> Show All File** from the menu bar to show entire capture. Note how 25% of the capture is before the trigger line. This corresponds to the 25% pre trigger setting we used in our **10 kHz Sine Wave** capture setup. The same review functions covered in the previous exercise apply here.

Cursors

Press the **Cursor A** icon. Slide the cursor just to the left of the trigger point. Press the **Cursor B** icon. Slide the cursor just to the right of the trigger point.

Time measurements using cursors

Choose **View >> Status Text Format >> Relative Time** from the menu bar. Observe the time values shown at the bottom.

Amplitude measurements using cursors

Choose **View >> Show Channel Information** from the menu bar. Move **Cursor B** by sliding it to the right. As you move the cursor, observe the change in values in the **Channel Information** window.

Remove the cursors

Press the **A** cursor icon and **B** cursor icon to remove them.

This concludes the Scope Mode Data Capture portion of this sample exercise.

Exercise #2: Monitor a 9V Battery in Realtime Mode

In the following hands-on exercise, you will set up a channel to monitor a 9 Volt battery in Real-time. Next, a data capture will be set up to record when the battery voltage is applied. Finally, the captured data will be reviewed.

The **ACTION** on the left-hand side describes what is to be done. The **HOW TO** section provides the detailed steps to take using the pull-down menus of the Menu Bar.

I. Real-time Monitoring: Monitor the voltage of a 9 Volt battery.

Items needed: 9 Volt battery. Signal input leads, Female Banana to Male BNC connector (Required for the Dash 32HF only).

ACTION HOW TO (Use the Menu Bar Pull-Down menus)

Verify Menu Bar display If the date and time are shown at the top of the screen, press the **M** icon in the upper right hand corner to show the Menu Bar.

File Configuration View Setup Cursors Capture Service Chart Help

Dash "HF" Realtime Menu Bar

Default the Dash "HF"

Choose **Configuration >> Utilities** from the menu bar to open the **Utilities** window.
Choose **Defaults >> System** from the menu bar to set the recorder to factory defaults.
Click **Yes** to accept.

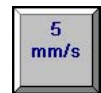
Enter Realtime Mode Choose **Configuration >> Realtime** from the menu bar to enter **Realtime** Mode.

View Channel 1

Choose **View >> Chart / Display Wizard** from the menu bar.
Enter "1" into the **Waveforms** box located at the top/center of the **Chart/Display Wizard** box. Press **OK**.

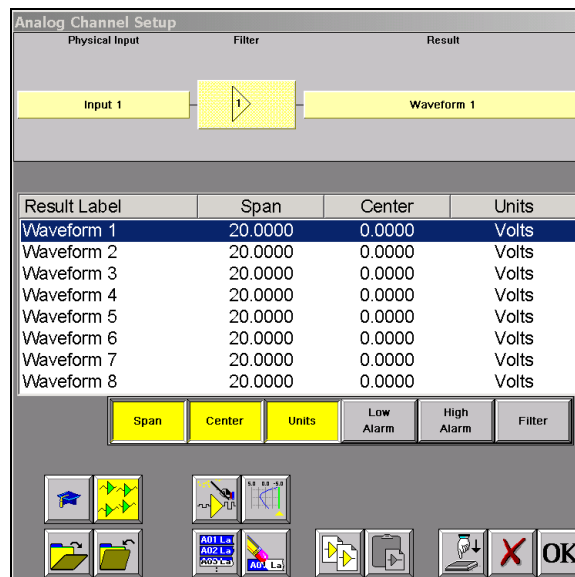


Set speed to 5 mm/sec Press the **[5 mm/s]** icon on the control panel.



5mm/s Icon

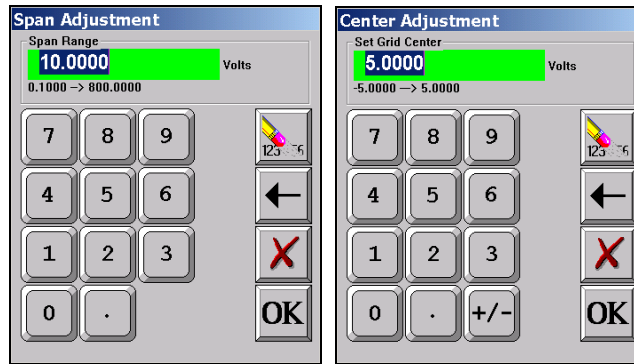
Set Channel #1 to be 10 Volts Full Scale



Dash "HF" Amplifier Channel Settings (Analog Channel Setup) Window

Continued...

Choose **Setup >> Amplifier Channel Settings (Analog Channel Setup)** from the menu bar. Highlight **Waveform 1**.



Span and Center adjustment keypads

Set Channel Span

Press the **Span** column. The **Span Adjustment** box will appear. Press the digit “1” and “0” to select 10. Press **OK** on the **Span Adjustment** box.

Span

Set Channel Center

Press the **Center** column. The **Center Adjustment** box will appear. Press the digit “5” to select 5. Press **OK** on the **Center Adjustment** box. Press **OK** on the **Amplifier Channel Settings (Analog Channel Setup)** window.

Center

Input battery voltage into Channel #1

Use the banana jack input connection located on the side of the Dash 8HF and Dash 20HF and input the battery voltage into Channel #1. Channel 1 on the Dash 32HF is a differential channel. Use the D-Shell to BNC adaptor that came with the unit. You will need a female Banana to Male BNC connector to interface the signal leads to the D-Shell to BNC interface.

Measure the battery voltage using the color display

Choose **View >> Meter** from the menu bar to activate the Meter Mode. Observe the battery voltage. Choose **View >> Meter** from the menu bar to remove the meter.

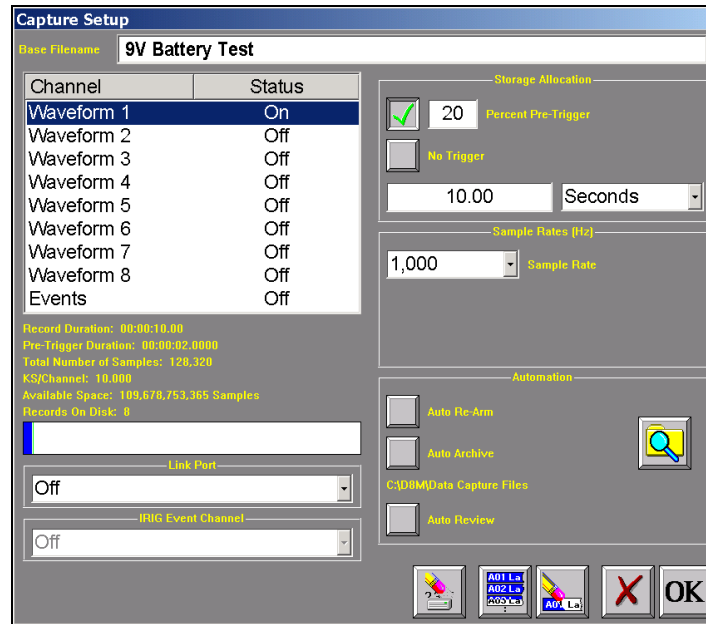
Remove Battery Voltage

Remove battery voltage.

This concludes the Realtime monitoring portion of this sample exercise.

II. Data Capture Settings

Set up a single data capture on Channel 1 only for 10 seconds. Of the total capture time, two seconds of the capture should show what the signal looked like before the battery voltage was applied. The sample rate will be 1,000 samples per second.



Capture Setup Window

ACTION

HOW TO

(Use the Menu Bar Pull-Down menus)

Enter data capture setup

Choose **Capture >> Capture Settings** from the menu bar to open the **Capture Setup** window.

Select capture of Channel 1

Highlight **Waveform 1**. Be sure the **Status** for **Waveform 1** is **On**. If not, click on the **Status** menu bar and select **On**.

To reduce the size of the data capture, it is recommended that unused channels be turned off. This makes a more compact file that is easier to export out of the **Dash "HF"**.

Turn off capture of remaining channels

To turn off unused channels in the **Capture Setup** window select the **Select All** icon. Then deselect **Waveform 1**, which was set to **On** in the previous step. All channels should be highlighted with the exception of **Waveform 1**. Click the **Status** menu bar and select **Off**. The status of **Waveform 1** should be **On** while the remaining waveforms and events should have a status of **Off**.



Select All Icon

Set sample rate to 1 kHz

In the **Sample Rates (Hz)** section of the **Capture Setup** window box, press the down arrow and press **1,000**.

Set capture for 10 seconds

In the **Storage Allocation** section of the **Capture Setup** window, press the units pull-down box and select **Seconds**. (Other choices are *minutes, hours and Ksamples*). Press the value box located to the left of the units pull down menu to open the Seconds Window. Press the digits "1" and "0". Press **OK**.

Set trigger point at 20%

In the Storage Allocation box, press the **Percent Pre-trigger** box. Press the digits "2" and "0". Press **OK**. Be sure there is a green check mark next to the **Percent Pre-Trigger**.

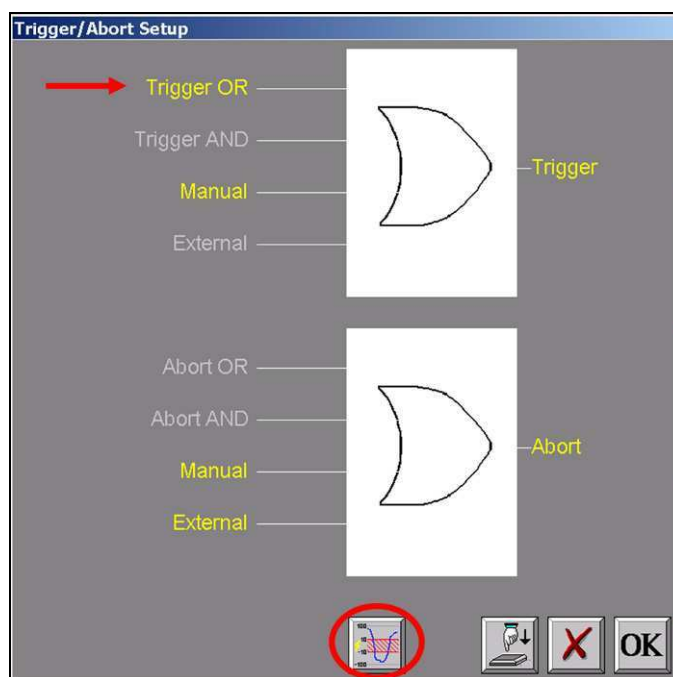
Continued...

Verify time of capture	Below the waveform selection window, in yellow text, the Record Duration should be 10 seconds , the Pre-Trigger Duration should be 2 seconds .
Set capture name	Press the Base Filename box, erase the name DCR and type 9V Battery Test
Set capture for one record	In the Automation Box, be sure that both the Auto Re-Arm & Auto Archive are not checked. <i>At this point, your Capture Settings Window should look like the image above.</i>
Save and exit data capture setup	Press OK .

This concludes the Data Capture settings portion of this sample exercise.

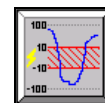
III. Trigger Setup and Data Capture

In the Data Capture Settings section above, a ten-second capture was set up with two seconds of pre-trigger (data before the trigger). In this section, a trigger level of 8 Volts will be set with a rising edge type trigger so that as the signal rises and reaches 8 Volts, the data capture will be triggered.



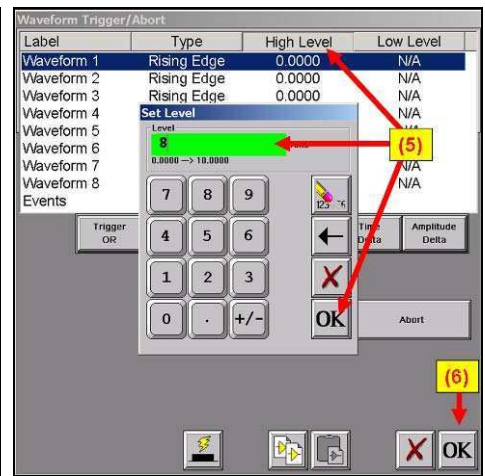
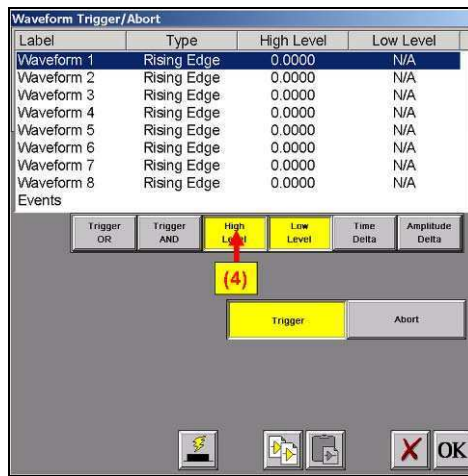
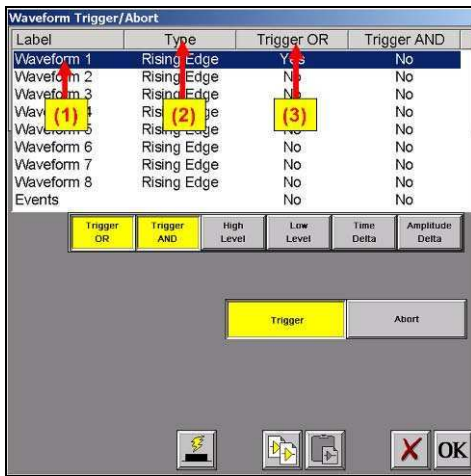
Trigger Settings Menu

ACTION	HOW TO	(Use the Menu Bar Pull-Down menus)
Enter Trigger Settings	Choose Setup >> Trigger Settings from the menu bar to enter Trigger Settings.	
Select Software triggering	Press Trigger OR to highlight in yellow. Since we reset the system defaults at the beginning of this exercise, the Manual Trigger input and Trigger output will be highlighted. Press the Trigger Level icon (1 ST icon in the row of icons at the bottom) to open the Waveform Trigger settings menu.	



Trigger Level Icon

Continued...



Trigger Type Menus

- (1) In the **Waveform Trigger** window, highlight **Waveform 1**.
- (2) Press **Type**. Then select Rising Edge from the Type pull down menu.
- (3) Press **Trigger OR**. Then select Yes. This will enable the **Trigger OR** trigger feature.

Set Dash "HF" to trigger when 9 Volts is applied

- (4) Under the Waveform Trigger window there are six icons. Select the **High Level** icon to enable the High Level and Low Level settings columns.



- (5) Press the High Level pull down menu (Located to the right of the **Type** pull down menu) and enter "8" in the Set Level keypad and press OK.



- (6) Press **OK** at the lower right hand corner of the menu.
You have just set the trigger to be asserted when the signal input into channel one rises past 8 Volts.

Arm for capture

Choose **Capture >> Arm** from the menu bar to arm for capture.
The Capture Progress window pops up indicating status. The pre-trigger will be recorded.

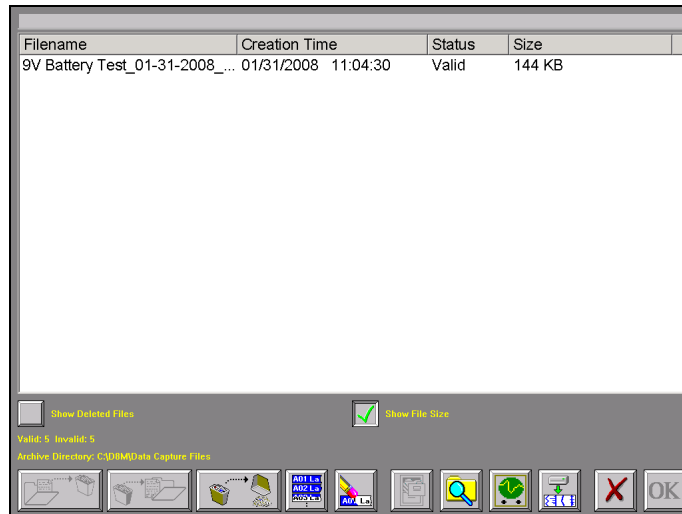
Input battery voltage into Channel #1

A trigger should be produced and the capture continues to the end. While capturing, you should have seen the waveform for Channel #1 increase from the bottom of the channel to near the top of its channel.

This concludes the Trigger Setup and Data Capture portion of this exercise.

IV. Data Review

Data capture records can be reviewed on the color touch-screen display. DVD-like control icons allow for convenient scrolling through the data. Cursors can be placed on the data for measurements.



9V Battery Test data capture record for review

ACTION

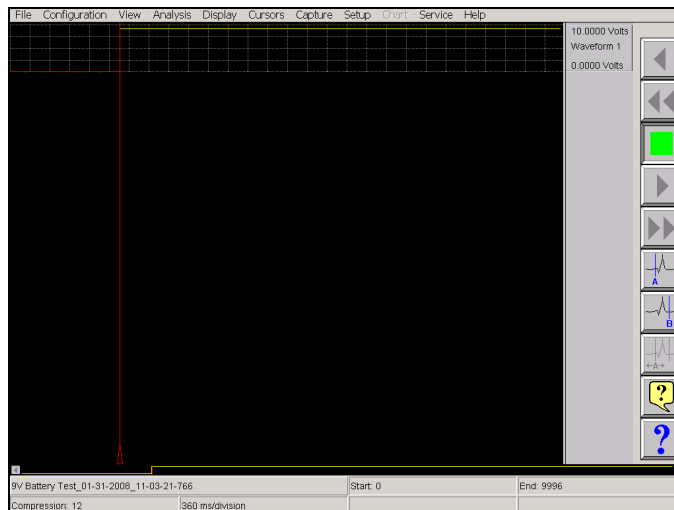
HOW TO (Use the Menu Bar Pull-Down menus)

Enter Review Mode

Choose **Configuration >> Review** from the menu bar to enter Review Mode.

Select Review File

Click on the top-most file name to highlight the capture. Press **OK**.



Data Capture Review of 9 Volt battery data capture

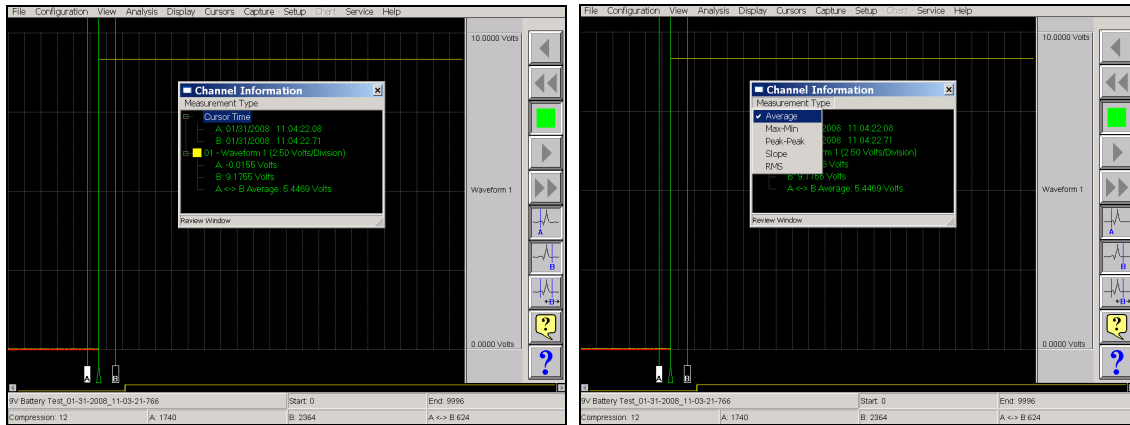
Show entire capture

Choose **Display >> Show All File** from the menu bar to show entire capture.
Note: If the entire file is already shown, a check mark will be next to Show All File in the Display pull-down menu.

Show the trigger point

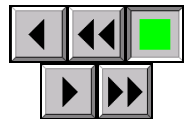
Choose **Display >> Show Trigger Line** from the menu bar to show the trigger point.
Note: The trigger line is shown as a red vertical line. If the trigger line is already shown, a check mark will be next to Show Trigger Line in the Display pull-down menu. Be sure the trigger line is shown on the display.

Continued...

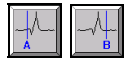


Using cursors to make measurements

- Show only Channel 1** Choose **View >> 1 Channel** from the menu bar to show only Channel 1.
- Expand the time base** Choose **Display >> Compression** from the menu bar. Press the digit “1”. Press **OK**.
- Scroll through the data** Use **Scroll** icons. You can jog forward or backwards through the data. You can stop at any points of interest. Experiment scrolling forwards and backwards.
Continue to scroll and stop the display when you have the trigger point (red vertical line) in the middle of the display.
- Cursors** Press the **A** cursor icon. Slide the cursor just to the left of the trigger point.
Press the **B** cursor icon. Slide the cursor just to the right of the trigger point.
- Time measurements using cursors** Choose **View >> Status Text Format >> Relative Time** from the menu bar.
Observe the time values shown at the bottom.
- Amplitude measurements using cursors** Choose **View >> Show Channel Information** from the menu bar.
Move Cursor **B** by sliding it to the right. As you move the cursor, observe the change in values in the Channel Information window.
- Remove the cursors** Press the **A** cursor icon and **B** cursor icon to remove them.
- Show entire capture** Choose **Display >> Show All File** from the menu bar to show entire capture.



Scroll Icons



Cursor A and B Icons

This concludes the Realtime Mode exercise.

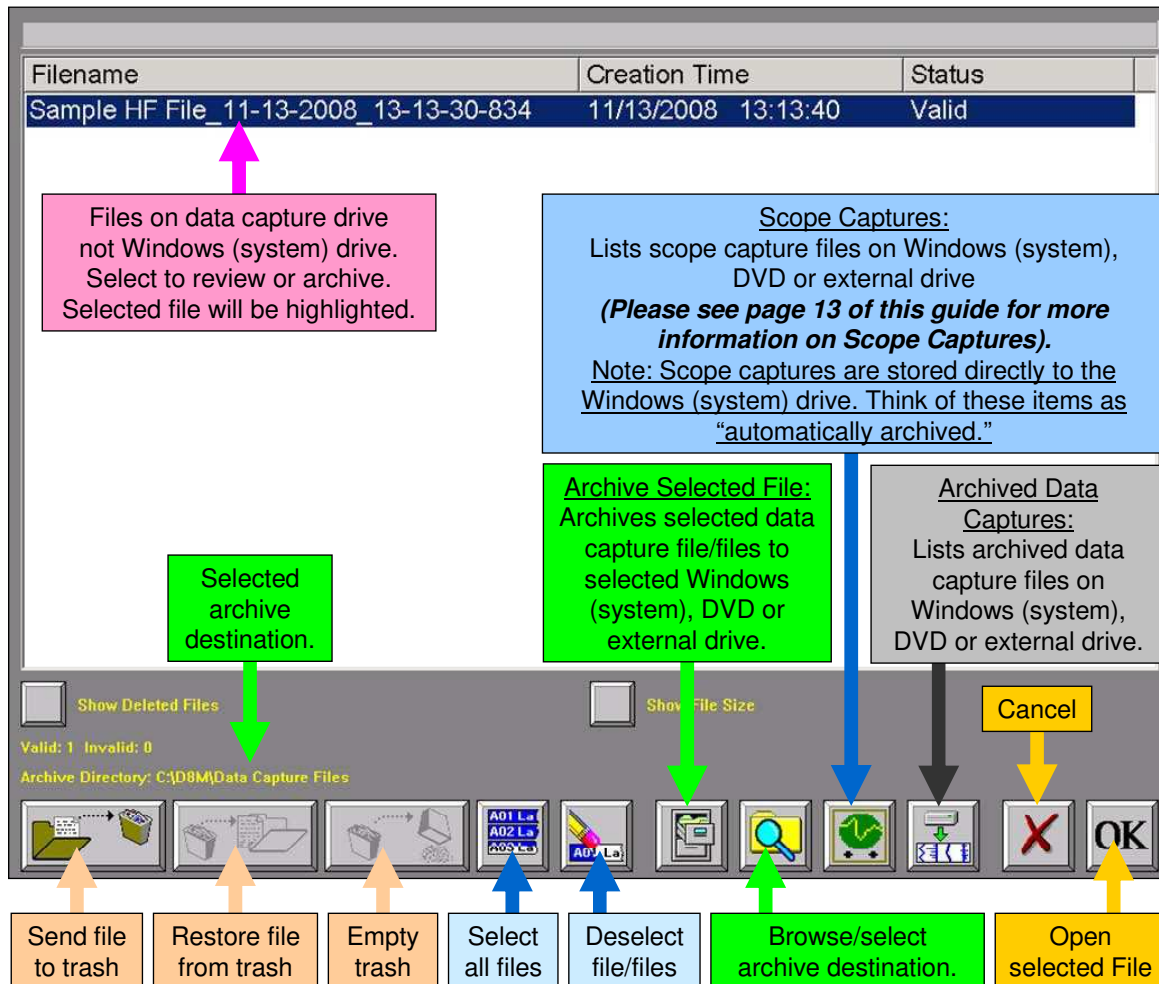
9. ARCHIVING DATA RECORDS

There are two hard drives in the **Dash "HF"**. The first is the Windows (System) drive and the second is the data capture drive. During data capture, the data is streamed to the data capture drive. Once the data capture is complete, the file can be reviewed on the **Dash "HF"**. However, to export the data out of the **Dash "HF"**, the user must archive it from the data capture drive to the Windows (system) drive or directly to the internal DVD drive (standard unit only) or an external USB source.

The data capture drive is not accessible through Windows Explorer. The only way to export or archive the data off the capture drive is by using the **Dash "HF"** software environment. Data is handled this way in order to maintain the integrity of the recording.

ACTION HOW TO (Use the Menu Bar Pull-Down menus)

Enter Review Mode Choose **Configuration >> Review** from the menu bar to enter Review Mode.



Summary of Review Mode Screen Icons

Choose Archive Directory

By default, the file will be saved on the system drive (C) in the noted location. The path to this location is displayed in yellow text (see above). If necessary, the file can be saved in a different location. To select an alternative file location, the Browse/select archive folder icon.

The Browse for Folder window will appear.



Browse/select archive folder Icon

Continued...



Browse for Folder window

Note: If you are using the standard **Dash “HF”**, the DVD+RW is assigned drive letter D. USB storage devices are drive letters E and F. If you are using the high security version, which does not have a DVD+RW drive, USB storage devices are drive letters D and E.

Select File Location

Select a file location and choose the **OK** icon on the Browse for Folder window. The path displayed in yellow text will be updated to indicate the new file destination.

Select File to Archive

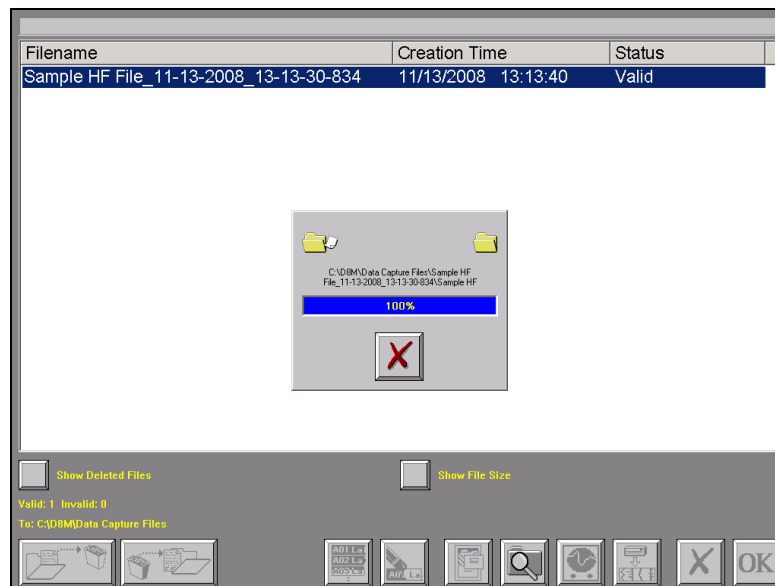
Select the file that you wish to archive. The selected file will be highlighted.

Archive File

Select the Archive File icon to archive the selected file. A status pop-up will appear showing the percentage completed. Once the file has completed archiving, select **OK** to exit the Review mode screen.



Archive Selected File/Files Icon



Review Mode Screen Showing Archiving file Status

Note: The **Dash “HF”** series offers additional methods to archive data. The user can archive all or part of a file while reviewing along with archiving in ASCII format. Please see the **Dash “HF”** operations manual for additional information.

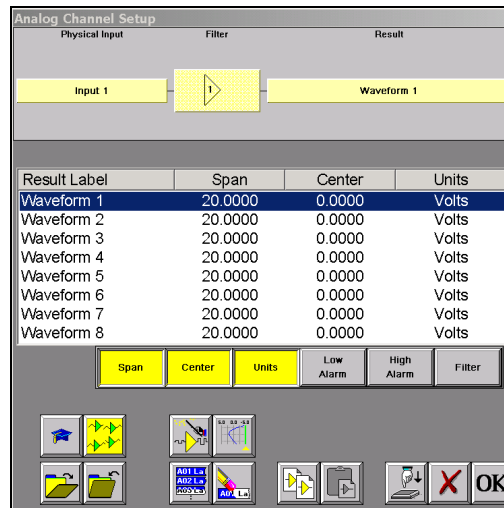
This concludes the Archiving Data Records section.

10. ENTERING ENGINEERING UNITS

Engineering units provide the capability to display user-selected units instead of voltage. All signal information enters the **Dash “HF”** as voltage. However, converting the voltage unit to an alternative unit of measure may be desirable in applications that measure current, pressure, strain, or any non-voltage unit.

This allows the **Dash “HF”** to be compatible with transducers and probes that can provide a voltage output to the **Dash “HF”**. The relationship between the voltage and the engineering unit is assumed to be linear, characterized by a slope and offset ($y = mx + b$).

The following is an example of entering engineering units into the **Dash “HF”**. For this example, we will assume we are entering the engineering units for a current probe that provides a **10mV/A** voltage output to the **Dash “HF”**.



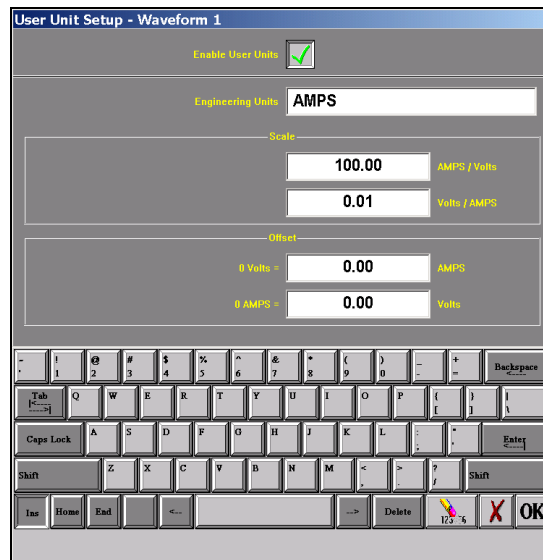
Dash “HF” Amplifier Channel Settings (Analog Channel Setup) Window

ACTION	HOW TO (Use the Menu Bar Pull-Down menus)
Set the engineering units on Channel #1 to be 10mV/A	Choose Setup >> Amplifier Channel Settings (Analog Channel Setup) from the menu bar. The Amplifier Channel Settings (Analog Channel Setup) menu will appear. Highlight Waveform 1 .
Open User Units Menu	On the Amplifier Channel Settings (Analog Channel Setup) window, Choose Units >> Enter User Units , the User Unit Setup – Waveform 1 window will appear.
Enable User Units	Select the Enable User Units icon located in the top center of the User Unit Setup – Waveform 1 window. The Enable User Units icon should be checked.
Enter User Unit	Select the Engineering Units box under the Enable User Units icon. A type pad will appear. Erase the unit Volts and enter AMPS .

Continued...

Enter Scale

Under the **Engineering Units** box on the **User Unit Setup – Waveform 1** window there is a section named **Scale**. Now that you have entered **AMPS**, you can now enter either **AMPS/Volts** or **Volts/AMPS**. Since our probe has a **10mV/A** output, we will enter **0.01** into the **Volts / AMPS** box. Press the **Volts / AMPS** box and enter **0.01** into the **Scale** keypad. Press **OK** on the **Scale** keypad. Press **OK** on the **User Unit Setup – Waveform 1** screen. Press OK on the **Amplifier Channel Settings (Analog Channel Setup)** window.



User Unit Setup – Waveform 1

Press OK

Press **OK** on the **User Unit Setup – Waveform 1** screen. Press **OK** on the **Amplifier Channel Settings (Analog Channel Setup)** window. Waveform (Channel) 1 is now set to measure current using a 10mV/A current probe.

This concludes the engineering units example.

11. POWERING DOWN

When the power switch is set to the off position or if AC power is lost or removed, the **Dash “HF”** begins the power down sequence. This is indicated by the green LED next to the power switch that will be on while the power down sequence occurs. Note that the LED will either be a solid green or it may flicker. It is **very important** not to turn the power switch back to the on position during the power down stage. The **Dash “HF”** recorder must be allowed to complete the power down sequence to insure proper operation.

This completes the **Dash “HF”** Quick Start Guide. Please note that the Dash 8HF, Dash 8HF-HS, Dash 20HF, Dash 20HF-HS, Dash 32HF and Dash 32HF-HS have much more capability than presented in this guide. Please see the Operations Manual for details. Should you require additional assistance, you can contact our Technical Support Department toll-free at 877-867-9783 or by e-mail: techserv@astromed.com