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# Dash 8u Recorder

## QUICK START GUIDE

*Supports Recorder System Software Version 11.9*

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1. INTRODUCTION
2. GETTING STARTED
3. FRONT PANEL CONTROLS
4. REAL-TIME RECORDING FUNCTIONS
5. SETTING UP CHARTS AND GRIDS
6. AMPLIFIER SETTINGS
7. DATA CAPTURE
8. DATA REVIEW
9. SAMPLE EXERCISES



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# 1. INTRODUCTION

Thank you for choosing the Astro-Med Dash 8u field and lab recorder. It is important that you read the enclosed operations manual. You simply will not get the most out of your Dash 8u unless you do. However, it is human nature for you to want to get started right away. We understand this, and have prepared this Quick Start Guide to let you get acquainted with the Dash 8u as quickly as possible. We hope you enjoy it - and your new recorder. But then, please read the operations manual.

# 2. GETTING STARTED

**VOLTAGE VERIFICATION**

The Dash 8u has an auto-sensing power supply that operates from 85-220 VAC at 50 or 60 Hz. You do not have to set up any fuse block arrangement.

**CONNECT AC POWER**

Connect the AC power cord to the Dash 8u rear panel, then to an outlet.

**LOAD CHART PAPER**

Remove the protective wrapping around the paper. Open the paper chamber door located at the left side of the unit. Insert the top sheet with the arrows pointing towards the paper chamber immediately below the black bar beneath the drive roller as you place the pack of paper inside the paper chamber. Push the paper through the paper-feed channel until the paper exits the recorder above the drive roller. Close the paper chamber door.

**TURN ON DASH 8u**

When you turn on the Dash 8u, the color display will read initialization and then the recorder will load in the last setup it had before it was powered down.

**START RECORDING**

Signal leads are not supplied with the Dash 8u. The physical input for each channel is a five pin universal input terminal block connector. Mating connectors are provided. To adapt your signal input to be guarded banana jacks, the optional ADM-8u is available. Select the appropriate amplifier type and wire to the corresponding pins to bring your signals into the recorder at the side panel. Press the **[RUN / HALT]** key. The Dash 8u will begin recording. Look at the top edge of the chart - the System Log repeatedly prints the time, date, chart speed and time scale. Refer to the Manual to change the time and date. If you wish to change the chart and grid presentation, *see Section 5 below for further details.*

**HALT**

Experiment stopping/starting the chart by pressing the **[RUN / HALT]** key.

**CHANGE SPEEDS**

A group of keys in the center of the front panel controls the chart speed. Dedicated keys provide a means for quickly setting the common chart speeds. Non-standard speeds can be set easily as well using the **[SPD]** key.

**HELP KEY**

When the front panel **[HELP]** key is pressed, three levels of help are available to be printed onto the chart paper: System Report, Chart Report, General Help.

**COLOR DISPLAY**

The Dash 8u provides a color display for view of real-time and captured signals. You can freeze the display at any time you have real-time signals inputted. Once frozen, use the encoder wheel to move two cursors (A, B) to make time and amplitude measurements. You can then run the display to view the real-time signals again.

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# 3. FRONT PANEL CONTROLS

**COLOR DISPLAY**

The color display is divided into four areas. Most of the display is used to show the waveforms and grids. The area above and below the waveform display is used for text related to menu items. On the right of the display is the menu display area. This menu display area uses the ten menu display keys immediately to the right of the color display.

The color display is used for real-time as well as data capture viewing. When you make your choices using the menu display keys, the bottom part of the display reports your settings as well as highlights the active choice.

**ENCODER WHEEL**

Because the Dash 8u is versatile, where many choices are available, an encoder wheel is used to quickly move through the selections. An example is gain setup where the wheel is used to select your range and offset. Also, the encoder wheel is used for moving the cursors when reviewing data.

**ALPHANUMERIC KEYPAD**

A full QWERTY alphanumeric keypad is used for chart annotation (upper and lower case), user scaling (engineering units), and setting up the gain of the channels (range and offset).

**SPEED CONTROL**

There are eight buttons for speed control. Four buttons give quick selection of common speeds**: [1]**, **[5]**, **[25]**, **[50]**. Three other buttons to select the rate: **[HR]**, **[MIN]**, **[SEC]**. The last key is the **[SPD]** key used to adjust the paper speed, data logger (numeric) speed, select internal or external motor source, the speed of the display (normal or trend) and to adjust the chart speed (+/- 2%).

**AMP KEYS**

Eight keys, one each for the eight signal inputs. Set full scale range, offset (zero offset) from the center of the channel, ground or unground the channel, select peak-to-peak or RMS, setup filter, assign engineering units. Selecting the amplifier type and calibration are here as well.

**RUN / HALT KEY**

Used to start and stop the chart paper real-time recording.

**OPERATION HOTKEYS**

**[HELP]** Three levels of help.

| | |
|---|---|
| System Report: | Amplifier, data capture and triggering settings. |
| Chart Report: | Grid settings for all four charts. |
| General Help : | Quick overview of Dash 8u functions. |

**[FEED]** Advances the chart paper as long as this key is pressed.

**[ID]** Puts the channel number next to the waveform on the chart and display. This key is useful with overlapping channels.

**[MARK]** Toggles the system event marker located underneath the system log on the chart.

**[ARM]** Used to activate the data capture mode. Works with or without the chart paper running.

**[TRIG]** Manual trigger for data capture.

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**[SYS]** System key used for setting up various parameters for the Dash 8u. Design or modify an existing chart. Edit text labels. Set up data capture and triggering. Save or recall a system set up (Zip disk). Other system functions such as real-time clock, display colors, defaulting settings and software upgrade.

**[MODE]** Select and run any of the four available charts. Select data logger (numeric), timed recording or dual speed mode. Select captured data to review as well as importing and exporting data to Zip disk.

# 4. REAL-TIME RECORDING FUNCTIONS

- Four available chart formats: Design grid for number of channels. Pick to overlap some, all or none of the channels.
- Data logger (numeric output): Select rate at which to print values.
- Timed recording: Pick one of four charts. Select the start and end times for recording.
- Dual Speed Recording: Select two chart speeds at which to run the paper and select either the trigger or time duration to switch between the speeds. The most common use is recording at the first selected chart speed, utilizing waveform triggering to change to the second chart speed for a predetermined amount of time. At that point, the recorder will automatically switch back to the first selected chart speed, awaiting another trigger.

During real-time recording, the display will show your signals. At the same time, you can print to paper using the **[RUN / HALT]** key.

# 5. SETTING UP CHARTS AND GRIDS

The Dash 8u gives you total control over chart 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 printing as well as vary the waveform trace thickness. Further, you can overlap some or all of the channels.

**DEFAULT CHARTS**

The Dash 8u has four programmable charts. They are defaulted at the factory prior to shipping. The defaulted charts are eight grids, four grids, two grids, and one grid. You may find this a convenient place to start.
At any time, you can default the charts as follows:
**[SYS] [CUSTOMIZE CHART] [DEFAULT ALL CHARTS]**

**RUNNING A CHART**

**[MODE] [RUN CHART *X*]** where ***X*** = 1 or 2 or 3 or 4.
Immediately, you will see the waveforms scrolling across the color display as well as the chart paper begins to run. Use the **[RUN / HALT]** key to stop the paper.

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**CUSTOMIZING A CHART**

If you don't find a chart you like from one of the four charts programmed in your Dash 8u, you can change the chart in two different ways.

- The first is Auto-Chart: **[SYS] [AUTO-CHART SETUP]**
  Here the Dash 8u walks you through selecting how many channels you want and whether to overlap them or display them individually. You are prompted to save this chart to one of the four available charts.
- The second method is to set up each channel's grid parameters manually: **[SYS] [CUSTOMIZE CHART]**… Note that the changes made will affect the current chart that you are working with (Chart 1-4).
  There are three parameters involved with displaying a channel:
  Grid, waveform trace and text buffer.

It is recommended for each channel used that its grid be turned ON: **[SYS] [CUSTOMIZE CHART] [CHANGE GRID]**. Under this menu, you can change the size, location and appearance of each grid.

Also, each channel used should have its trace drawn on the chart: **[SYS] [CUSTOMIZE CHART] [CHANGE WAVEFORM] [PEN UP/DOWN]**.

Lastly, there are eight text buffers that are defaulted to write a channel number. Although the buffers are independent of the grid and waveform, it is typical to associate one text buffer for each channel. It is recommended to turn off the buffers for those channels not used: **[SYS] [EDIT LABELS / TEXT]**.

# 6. AMPLIFIER SETTINGS

There are eight amplifier keys located on the right side of the front panel. When a channel is selected, several choices for channel settings are available:

| | |
|---|---|
| **[SET RANGE]** | Sets full scale value for the channel. |
| **[SET OFFSET]** | Sets the zero offset from the center of the channel. |
| **[DC / GND]** | Toggle between grounding and ungrounding the channel.<br>*This does not ground the signal input itself!!* |
| **[PK - PK / RMS]** | Toggle between peak-to-peak or RMS value. |
| **[SETUP DSP / FILTER]** | Select type of filter (notch, low pass, high pass, band pass). |
| **[SETUP USER SCALING]** | Assign engineering units to the channel values. Includes offset compensation. |
| **[COPY AMPLIFIER]** | Copy part or all of a channel setup to another or all other channels. |
| **[CALIBRATE]** | Calibrate channels using external module provided with your Dash 8u. |
| **[ADVANCED]** | Attenuator settings for selected amplifier type.<br>Change amplifier type (single-ended, differential, temperature, DC bridge, RTD, High Voltage, Very High Voltage, Frequency-to-Voltage). |

*See exercises in Section 9 for details on using the Amp keys.*

**NOTES:**

For each of the eight amplifier types, there are different attenuator ranges. If you can't get the desired range and offset, you need to select a different attenuator.
If you will use user scaling to assign engineering units, it is recommended to first set up your channel in terms of voltage and verify you signal. Then, assign your units.
The upper and lower bounds of the channel can be printed in the latter part of the text buffer for the channel: **[SYS] [CUSTOMIZE CHART] [CHANGE WAVEFORM] [AMP REPORT ON]**

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At this point, you can run the chart with your signals. Press the **[MODE]** key and run the chart you set up. To stop the paper, press the **[RUN / HALT]** key. You can also freeze the display and use two cursors (A, B) to make time and amplitude measurements. You can print the screen or even save the screen image to your Zip disk.

# 7. DATA CAPTURE

The Dash 8u has a 4 Gigabyte hard drive for data capture. In order to capture data, a trigger must be produced. For each record, pre- and post-trigger data can be captured. You must select the conditions under which you will capture data (trigger set up) as well as how you will collect the data (number of samples per second and for how long). Further, within the data capture record, you can pick where the trigger point will be placed.

**SETUP DATA CAPTURE** — **[SYS] [SETUP DATA CAPTURE]**
There are five parameters for setting up data capture:

**[SET SAMPLE RATE]** Use the encoder wheel to select how many samples per second you will take.

**[SET RECORD SIZE]** Use the encoder wheel to select how much memory you will use. To help you decide, the length of capture (time duration) is shown. Pick enough memory to give you enough recording time.

**[SET TRIGGER WINDOW]** Use the encoder wheel to select where within the capture the trigger will be. In addition to Start, Center and End, the trigger can be any percentage value of the record. By placing the trigger point at any value other than Start, you will record pre-trigger data.

**[SET OPERATION]** You can capture one record only (single capture) or capture one record only and play it to the chart (single capture and playback). Select multi-capture with or without playback to capture more than one record. With multi-capture, the Dash 8u re-arms itself, waiting for the next trigger.

**[AUTO TRIGGER]** When auto-trigger is ON, as soon as the Dash 8u is armed (**[ARM]** key), it will start a data capture. When auto-trigger is OFF, the Dash 8u waits for a trigger.

**SETUP TRIGGER** — **[SYS] [SETUP TRIGGER]**
Once the data capture is set up, select the conditions under which you will take data. In addition to auto-trigger listed above, there are five other ways to trigger a capture:

**[MANUAL]** When activated, the **[TRIG]** key on the Dash 8u will produce a trigger.

**[WAVEFORM]** When activated, a change in signal level will produce a trigger:
**[SYS] [SETUP TRIGGER] [SETUP WAVEFORM]**. Pick the channel(s) to set up and how it will trigger: **[SET TYPE / CLASS]**. When more than one channel will be used for triggering, you can select OR or AND combinations. Each channel's trigger levels are independent of the other channels. You can use window triggering (either inside or outside the window), level triggering (above or below the level), slope triggering (rising, falling or either slope) and slew rate triggering.

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For window, level and slope triggering, percentage values are listed. This percent value is with respect to the edge-to-edge location on the chart where 0% is the bottom of the chart, 50% is the middle of the chart and 100% is the top of the chart. Knowing the signal placement on the chart from analog setup, you can pick the appropriate percentage level. *See exercises in Section 9 for use of waveform triggering.*

**[EXTERNAL]** Allows TTL or switch closure to ground trigger (*see utility port pin-out*).

**[CLOCK]** Produces a trigger at pre-defined periods. For example, if it is set to one hour, then every hour there will be a trigger. Also, you can set a one-time trigger at a pre-defined date and time.

**[EVENT]** Select the event pattern to produce a trigger based upon the eight standard event markers.

Once you have set up the analog, data capture and trigger parameters, you can press the **[ARM]** button (near the encoder wheel) to start a data capture record. The Dash 8u will be ready for the trigger to complete the record.

# 8. DATA REVIEW

Once a data capture record is complete, several things can be done with the data. It can be reviewed on the color display, played back to the chart paper, copied to the Zip disk or sent to a computer by ethernet.

**[SCREEN PREVIEW]**

**[MODE] [DATA RECORD REVIEW] [SCREEN PREVIEW]**
Part or all of the data can be acted upon. To help decide what part of the data is of interest, the color display allows preview of the data record.
In the screen preview, there are two cursors (A, B) for selecting data. You can page forward and backward through the data as well as expand or compress the time base. The lower part of the display shows the time and amplitude measurements.
Once you have selected data of interest, you can print the screen to chart paper, create a .BMP file on Zip disk, archive data to Zip disk, or play out the data to the chart paper.

**[SETUP PLAYBACK]**

**[MODE] [DATA RECORD REVIEW] [SETUP PLAYBACK]**
For playing the data to the chart paper, there is a dedicated set up menu.
Here is where the format for playback is selected (one of the four charts, numeric, X-Y plot). Also, you can select how much of the data to play back and whether to compress or expand the timebase.

*Throughout the setup of the Dash 8u, you can use the Help sheets to guide you. The System Report and Chart Report provide much useful information. The manual gives details on the keystrokes to achieve what you want to do with the Dash 8u. The above lists the basics of the Dash 8u. Under many of the menus are additional choices for more advanced capabilities of the Dash 8u. Should you require additional assistance, you can contact our Technical Support Department toll-free at 800-343-4039 or by e-mail: techserv@astro-med.com*

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# 9. SAMPLE EXERCISES

## Exercise #1: 9 Volt Battery Test

Items needed: 9 Volt battery. Signal input leads. Optional: ADM-8u adapter.

### I. Real-time Recording

**DISCUSSION**

Monitor the voltage of a 9 Volt battery input into Channel #1 *(Keep in mind that a new 9 Volt battery can have a voltage higher than 9.5 Volts)*. Use an eight grid chart. Set up the channel so that when there is no signal, the waveform trace will be at the bottom and when the 9 Volt signal is applied, the waveform trace will be near the top of the channel. The signal will be seen on the color display as well as on the chart paper.
Next, a data capture will be set up to collect data when the battery voltage is applied.

| ACTION | HOW TO |
|---|---|
| Default the Dash 8u | **[SYS] [SYSTEM SETUP] [SYSTEM DEFAULT] [YES]** |
| Select Chart 1 (4 individual channels) | **[MODE] [RUN CHART 1]** |
| Set speed to 5 mm/sec | **[5] [SEC]** *Common speeds have dedicated keys on front panel of Dash 8u.* |
| Stop the chart paper | **[RUN / HALT]** |
| Set Channel #1 to be 0 - 11 Volts FS | **[AMP 1]**<br>**[ADVANCED]**<br>**[CHANGE AMP TYPE]** *The Dash 8u has eight amplifier types.*<br>**[SET TO SINGLE-ENDED]** *Select the single-ended amplifier type.*<br>**[EXIT] [SET TO 40 V]** *Set the attenuator range to 40 Volts.*<br>**[EXIT] [SET RANGE]** *Turn encoder wheel until range is set to 11 Volts.*<br>**[SET OFFSET]** *Turn encoder wheel until offset is set to +5.5 Volts.*<br>**[EXIT]** |
| Input battery voltage into Channel #1 | *Wire the positive input to Pin 5 (Vin +) and the negative to Pin 4 (COM). (The optional ADM-8u converts the universal terminal to banana jacks).* |
| Run the chart | **[RUN / HALT]** *The signal for Channel #1 is now be close to the top.* |
| Stop the chart paper | **[RUN / HALT]** |
| Measure the battery voltage using the color display | **[FREEZE DISPLAY]** *Select Cursor A* **[CURSOR A]** *and turn the encoder wheel to move Cursor A. Observe the voltage readings shown at the bottom of the display. Experiment with Cursor B and then Cursors A+B. Amplitude and time measurements between the cursors are given on the bottom of the display When finished, run the display* **[RUN DISPLAY]** |
| Remove battery voltage | |

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## II. Data Capture

| | |
|---|---|
| **DISCUSSION** | Set up one data capture for 7.28 seconds. The capture should be triggered when the battery voltage is applied. The data capture should be a total of 7.28 seconds. Of the total capture time, 0.728 seconds of the capture should show what the signal looked like before the battery voltage was applied. |
| **ACTION** | **HOW TO** |
| Enter data capture setup | **[SYS] [SETUP DATA CAPTURE]** |
| Set sample rate to 1 kHz | **[SET SAMPLE RATE]** *The number of samples per second. In general, select at least ten times the frequency of your signal or the frequency of any changes in signal. Turn encoder wheel until sample rate is 1 kHz.* |
| Set record size to 32 Ks | **[SET RECORD SIZE]** *The Dash 8u will give you the amount of time that data will be captured based on the record size and the sample rate. This is shown under the duration field. Turn encoder wheel until record size is 64 Ks.* |
| Set trigger window to 10% | **[SET TRIGGER WIN]** *Placing the trigger at any point other than the start of the capture window will allow for pre-trigger data to be captured. Turn encoder wheel until trigger window is 10%.* |
| Set capture for one record | **[SET OPERATION]** *You can capture one record or re-arm for more captures. Turn encoder wheel for single capture.* |
| Be sure auto-triggering is OFF | **[AUTO TRIG]** *If auto-triggering is ON, toggle to OFF. If toggled ON, auto-triggering is designed to immediately capture data once the Dash 8u is armed.* |
| Enter trigger setup | **[SYS] [SETUP TRIGGER]** |
| Enable waveform triggering | **[WAVEFORM]** *Waveform should be toggled to ON position.* |
| Set up the level for triggering | **[TOGGLE LOGIC]** *Insure that OR logic is chosen and turn encoder wheel so that only Channel #1 is selected as a waveform trigger source.* **[SETUP WAVEFORM] [SET CHANNEL]** *Turn encoder wheel to select Channel #1.* **[SET TYPE / CLASS]** *Use wheel to select level - above for type of trigger.* **[<<FIELD>>]** *Turn encoder wheel to 80% (8.8 volts).* |
| Run the chart | **[RUN / HALT]** |
| Arm for capture | **[ARM]** *This key is located near the encoder wheel. The Dash 8u is now recording pre-trigger data, waiting for the trigger.* |
| 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 on both the color display and the chart. Note: you do not need to run the chart when you capture data.* |
| Stop the paper | **[RUN / HALT]** |

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**III. Data Review**

**DISCUSSION**

Data capture records can be reviewed on the color display as well as on the chart paper. Typically, the review is done on the display and then sections of interest are printed on the paper. During review, the timebase can be expanded or compressed to give appropriate detail of the signal.

| ACTION | HOW TO |
|---|---|
| Enter screen preview | **[MODE] [DATA RECORD REVIEW] [SCREEN PREVIEW]** |
| Toggle **[CURSOR SELECT]** button and move cursors near the trigger point (dotted line) | **[CURSOR SELECT A]** *Turn encoder wheel so A cursor is positioned just to the left of the trigger point (dotted yellow line on the display).*<br>**[CURSOR SELECT B]** *Turn encoder wheel so B cursor is positioned just to the right of the trigger point (dotted yellow line on the display).* |
| Expand view around trigger | **[PREVIEW SETTINGS] [SET WINDOW TO CURSORS]** |
| Expand the view further | **[CURSOR SELECT A]** *Turn encoder wheel so A cursor is positioned just to the left of the trigger point (dotted yellow line on the display).*<br>**[t - EXPAND ABOUT (A)]** *The expansion is around where the A cursor is set.* |
| Print the screen | **[OUTPUT …]** *Use encoder wheel to select screen print to paper.*<br>**[NEXT >>] [NEXT >>]** |
| Play back to paper | **[EXIT PREVIEW] [SETUP PLAYBACK] [SETUP OUTPUT FORMAT]**<br>*Verify format to be Y-T Chart #1.*<br>**[SET WINDOW] [CHANGE METHOD]** *Select the method of data expression to show the region of capture window.*<br>**[SET START POINT]** *Turn encoder wheel to 0%.*<br>**[SET END POINT]** *Turn encoder wheel to 20%.* **[EXIT]**<br>**[MODIFY SETTINGS]** *Set t-expansion: x2. Note that you can expand or compress the timebase for data playback to the chart. For long data records, it is suggested to use maximum compression for the first playback to conserve chart paper. Then, expand the playback to get the detail you need. As you change the starting and ending points from 100%, you can expand the playback timebase.*<br>**[<<FIELD>>]** *Verify the Header is ON and the Trig Mark is ON.* **[EXIT]**<br>**[BEGIN PLAYBACK]** |

## Exercise #2: Sine Wave Generator Test

Items needed: Waveform Signal Generator. Signal input leads.
Optional: ADM-8u adapter.

### I. Real-time Recording

**DISCUSSION**

Input a +/- 2 Volt sine wave, 1 kHz into Channel #1. Use a one grid chart. Set up the channel so that when there is no signal, the waveform trace will be at the center. When the sine wave signal is applied, the waveform trace will be shown symmetrically within the grid. The signal will be seen on the color display as well as on the chart paper. Next, a data capture will be set up to collect data when the sine wave signal is applied.

| ACTION | HOW TO |
|---|---|
| Default the Dash 8u | **[SYS] [SYSTEM SETUP] [SYSTEM DEFAULT] [YES]** |
| Create a chart with one signal | **[SYS] [AUTO-CHART SETUP] [NEXT >>]** *To begin auto-chart. Keep chart format to individual* **[NEXT >>]**. *Turn encoder wheel so that number of channels is 1* **[NEXT >>]**. *Keep chart with channel text* **[NEXT >>]**. *Turn encoder wheel to Chart 4* **[NEXT >>] [NEXT >>]** |
| Select Chart with Channel 1 | **[MODE] [RUN CHART 4]** |
| Set speed to 5 mm/sec | **[5] [SEC]** *Common speeds have dedicated keys on front panel of Dash 8u.* |
| Stop the chart paper | **[RUN / HALT]** |
| Set Channel #1 to be +/- 4 Volts FS | **[AMP 1]**<br>**[ADVANCED]**<br>**[CHANGE AMP TYPE]** *The Dash 8u has eight amplifier types.*<br>**[SET TO SINGLE-ENDED]** *Select the single-ended amplifier type.*<br>**[EXIT] [SET TO 40 V]** *Set the attenuator range to 40 Volts.*<br>**[EXIT] [SET RANGE]** *Turn encoder wheel until range is set to 8 Volts.*<br>**[SET OFFSET]** *Turn encoder wheel until offset is set to 0 Volts.*<br>**[EXIT]** |
| Input sine wave into Channel #1 | *Wire the positive input to Pin 5 (Vin +) and the negative to Pin 4 (COM). (The optional ADM-8u converts the universal terminal to banana jacks). Input +/- 2 V sine wave, 1 kHz.* |
| Run the chart | **[RUN / HALT]** *The signal for Channel #1 should be ½ of the full scale chart.* |
| Stop the chart paper | **[RUN / HALT]** |
| Measure the sine wave signal using the color display | **[FREEZE DISPLAY]** *Select Cursor A* **[CURSOR A]** *and turn the encoder wheel to move Cursor A. Observe the voltage readings shown at the bottom of the display. Experiment with Cursor B and then Cursors A+B. Amplitude and time measurements between the cursors are given on the bottom of the display When finished, run the display* **[RUN DISPLAY]** |
| Remove sine wave signal | |

## II. Data Capture

| | |
|---|---|
| **DISCUSSION** | Set up one data capture for 1.46 seconds. The capture should be triggered when the sine wave is applied. The data capture should be a total of 1.46 seconds . Of the total capture time, 0.292 seconds of the capture should show what the signal looked like before the sine wave was applied. |
| **ACTION** | **HOW TO** |
| Enter data capture setup | **[SYS] [SETUP DATA CAPTURE]** |
| Set sample rate to 10 kHz | **[SET SAMPLE RATE]** *The number of samples per second. In general, select at least ten times the frequency of your signal or the frequency of any changes in signal. Turn encoder wheel until sample rate is 10 kHz.* |
| Set record size to 128 Ks | **[SET RECORD SIZE]** *The Dash 8u will give you the amount of time that data will be captured based on the record size and the sample rate. This is shown under the duration field. Turn encoder wheel until record size is 128 Ks.* |
| Set trigger window to 20% | **[SET TRIGGER WIN]** *Placing the trigger at any point other than the start of the capture window will allow for pre-trigger data to be captured. Turn encoder wheel until trigger window is 20%.* |
| Set capture for one record | **[SET OPERATION]** *You can capture one record or re-arm for more captures. Turn encoder wheel to single capture.* |
| Be sure auto triggering is OFF | **[AUTO TRIG]** *If auto triggering is ON, toggle to OFF. If toggled ON, auto-triggering is designed to immediately capture data once the Dash 8u is armed.* |
| Enter trigger setup | **[SYS] [SETUP TRIGGER]** |
| Enable waveform triggering | **[WAVEFORM]** *Waveform should be toggled to ON position.* |
| Set up the level for triggering | **[TOGGLE LOGIC]** *Insure that OR logic is chosen and turn encoder wheel so that only Channel #1 is selected as a waveform trigger source.*<br>**[SETUP WAVEFORM] [SET CHANNEL]** *Turn encoder wheel to select Channel #1.*<br>**[SET TYPE / CLASS]** *Use wheel to select window - outside for type of trigger.*<br>**[<<FIELD>>]** *Use encoder wheel to set the High level to be 65% and the Low level to be 35%.* |
| Run the chart | **[RUN / HALT]** |
| Arm for capture | **[ARM]** *This key is located near the encoder wheel. The Dash 8u is now recording pre-trigger data, waiting for the trigger.* |
| Input signal 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 go from a zero baseline in the center of the channel to a sine wave within the grid on both the color display and the chart.*<br>*Note: you do not need to run the chart when you capture data.* |
| Stop the paper | **[RUN / HALT]** |

**III. Data Review**

**DISCUSSION**

Data capture records can be reviewed on the color display as well as on the chart paper. Typically, the review is done on the display and then sections of interest are printed on the paper. During review, the timebase can be expanded or compressed to give appropriate detail of the signal.

| ACTION | HOW TO |
|---|---|
| Enter screen preview | **[MODE] [DATA RECORD REVIEW] [SCREEN PREVIEW]** |
| Select Chart 4 for Preview | **[PREVIEW SETTINGS] [NEXT VIEW FORMAT]** *Continue to press this key until chart 4 is selected.* **[ACCEPT WINDOW]** |
| Toggle **[CURSOR SELECT]** button and move cursors near the trigger point (dotted line) | **[CURSOR SELECT A]** *Turn encoder wheel so A cursor is positioned just to the left of the trigger point (dotted yellow line on the display).*<br>**[CURSOR SELECT B]** *Turn encoder wheel so B cursor is positioned just to the right of the trigger point (dotted yellow line on the display).* |
| Expand view around trigger | **[PREVIEW SETTINGS] [SET WINDOW TO CURSORS]** |
| Expand the view further | **[CURSOR SELECT A]** *Turn encoder wheel so A cursor is placed just to the left of the trigger point.* **[t - EXPAND ABOUT (A)]** *The expansion is around where the A cursor is set.* |
| Print the screen | **[OUTPUT …]** *Use encoder wheel to select screen print to paper.*<br>**[NEXT >>] [NEXT >>]** |
| Play back to paper | **[EXIT PREVIEW] [SETUP PLAYBACK] [SETUP OUTPUT FORMAT]**<br>*Verify format to be Y-T Chart #4.*<br>**[SET WINDOW] [CHANGE METHOD]** *Select the method of data expression to show the region of capture window.*<br>**[SET START POINT]** *Turn encoder wheel to 15%.*<br>**[SET END POINT]** *Turn encoder wheel to 25%.* **[EXIT]**<br>**[MODIFY SETTINGS]** *Set t-expansion: x4. Note that you can expand or compress the timebase for data playback to the chart. For long data records, it is suggested to use maximum compression for the first playback to conserve chart paper. Then, expand the playback to get the detail you need. As you change the starting and ending points from 100%, you can expand the playback timebase.*<br>**[<<FIELD>>]** *Verify the Header is ON and the Trig Mark is ON.* **[EXIT]**<br>**[BEGIN PLAYBACK]** |

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