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CERTIFIED MANAGEMENT SYSTEM

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Dash 10 Recorder

QUICK START GUIDE
Supports Recorder System Software Version 12.3

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1. INTRODUCTION

Thank you for choosing the Astro-Med Dash 10 chart recorder. This Quick Start Guide was prepared to let you get acquainted with the Dash 10 as quickly as possible. We even include a sample exercise so you can become familiar with the basic operation.

Note: For earlier models, data capture was an option. In later years, data capture was a standard feature. If your model does not have data capture, the menus for data capture will not be present. See section 6 for more details.

2. GETTING STARTED

VOLTAGE VERIFICATION

Verify that the voltage selection cylinder through the window on the fuse block is set to the voltage that you will be using.

CONNECT AC POWER

Connect the AC power cord to the Dash 10 rear panel, then to an outlet.

LOAD CHART PAPER

Locate the free roll of paper included with your recorder. Open the box and remove the paper. Open the paper chamber door by pressing the paper chamber door release. Place the paper in the chamber and ensure that it is inserted so that it unwinds from the bottom of the roll. Allow a few inches of paper to extend out of the chamber. Close the paper chamber door.

TURN ON Dash 10

When you turn on the Dash 10, the vacuum fluorescent display will read Initializing..., then the recorder will display the menu that appeared when it was last powered down (Real-Time or Mode menu). The Real-Time menu indicates the chart number, time, date, speed and the state of the recorder (realtime or halted).

DEDICATED MENU KEYS

To the left of the display, a column of five black buttons are located.
To the right of the display, a column of five black keys are also located.
These ten keys are used to access various menus for operation of the Dash 10.
The five keys on the left of the display are:
[MODE]   [SYS]   [EDIT]   [Z/G]   [FEED]
The five keys on the right of the display are:
[HELP]   [ID]   [EVNT]   [ARM]   [TRIG]

SOFT KEYS

The Dash 10 uses ten soft keys (five above the display and five below the display) to access the menus. These keys are called soft keys because their function changes based on the menus that are used.

DEDICATED SPEED KEYS

There are 12 keys located in a row below the display. Six of the keys are dedicated to commonly used chart speeds. Two of the keys are used to select speed ranges in minutes or seconds. The [SPD] key is used to select from many of the different speeds available. The last three keys, [A], [B], [C] can be programmed to any speed.
We will make use of these speed keys in just a moment as we start recording.

START RECORDING

Signal connectors are not supplied with the Dash 10. You must supply the signal input connectors. Using standard banana jack connectors, bring your signals into the recorder at the front panel input connectors. Press the [RUN/HALT] key. The Dash 10 will begin recording. Look at the left edge of the chart - the System Log repeatedly prints the time, date, chart speed and time scale. Reference the Operations manual to change the time and date.

HALT

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

CHANGE SPEEDS

A group of keys in the lower center of the front panel controls the chart speed. Dedicated keys provide a means for quickly setting the common charts speeds. Non standard speeds can be set easily also.

DEDICATED SPEED KEYS

There are six dedicated speed keys on the front panel labeled [1], [5], [25], [50], [100] & [200]. They are programmed at 1, 5, 25, 50, 100 & 200 mm/sec respectively, while the chart is running.

- Press [100] and watch the chart speed change to 100 mm/sec.
- Press [5] and watch the chart speed change to 5 mm/sec.
- Press the [MIN] key to change to mm/min.
- Press the [SEC] key to change back to mm/sec.

Practice changing chart speeds using the Dedicated Speed and the [MIN] & [SEC] keys.

NONSTANDARD SPEEDS

Non standard speeds can be set easily by pressing the [SPD] key and entering the desired speed using the encoder wheel. You may enter speeds in any integer from 1 to 200 in two ranges: mm/sec & mm/min. Let's try!

- Press the [SPD] key. The SPD menu will appear.

SPD MENU

: mm/s	: mm/m	:		: ACCEPT :
CHART SPEED	25 mm/sec			
: CHART	: INSTA	: MOTOR	: DLOGGER	
: SPEED	: SPEED	: SOURCE	: SPEED	: EXIT :

- Turn the encoder wheel until the "CHART SPEED" reads 10 mm/sec.
- Press the soft key above "ACCEPT".

You can also change from mm/sec and mm/min by pressing the soft key above "mm/sec" and "mm/min", and then by pressing the soft key above "ACCEPT". Practice changing chart speeds using the encoder wheel and soft keys. After you are done return to the Real-time menu by pressing the soft key below "EXIT".

ABC INSTA SPEEDS

There are three insta-speed keys [A], [B], & [C] that can be programmed using the same SPD menu. They are currently programmed to 10, 75 & 150 mm/sec, but you can change them. Let's reprogram [C].

- Press the [SPD] key. The SPD menu will appear.
- Press the soft key under "INSTA SPEED". The INSTA SPEED menu will appear.

INSTA SPEED MENU

: SET A		: SET B		: SET C	:
A = 10 mm/s		B = 75 mm/s		C = 150 mm/s	
: CHART	: INSTA	: MOTOR	: DLOGGER		
: SPEED	: SPEED	: SOURCE	: SPEED	: EXIT	:

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• Press the soft key above "SET C". The top half of the INSTA SPEED
  menu will change (only the speed for C will be displayed).
• Turn the encoder wheel until 37 mm/sec is entered on the display.
• Press the soft key above "ACCEPT".

Now you have reprogrammed the [C] insta speed key to 37 mm/sec. Run the chart and then press [C] and watch the reaction. Return to the Real-time menu by pressing the soft key below "EXIT".

HELP KEY

When the front panel [HELP] key is pressed, the menu that results provides the following selections:

• General Help - provides an overview of some of the Dash 10's
  operating features.
• System Status - provides information on host, realtime recorder, data
  logger, timer mode and dual speed settings.
• Channel Status - provides information on pen status, grid status, grid
  size, major grid divisions, minor grid divisions, grid location, event status
  and event location.
• Buffer Status - provides information on buffer status, buffer location and
  text in buffer.
• Analog Status - provides information on voltage range, zero position,
  zero suppression, channel mode and filter status settings.
• Trigger Status - provides information on low level, high level and
  window trigger settings.
• Capture Status - provides information on data playback settings, data
  capture settings and data capture records.

When the soft key above/below each menu selection is pressed, the Dash 10 will print the associated report. Try pressing the soft key above each menu selection in order to become familiar with each type of report.

3. SETTING UP CHARTS AND GRIDS

The Dash 10 gives you total control over chart layout. You can set individual channel widths, channel locations, grid on/off and major and minor division sizing. You are also able to suppress or enable the printing of waveforms as well as vary the waveform trace thickness.

DEFAULT CHARTS

The Dash 10 has four programmable chart keys. The programmable Chart keys are currently programmed according to the four preset chart layouts. For more information see the Default Chart section of the Operations Manual. To run these charts:

• Press the [MODE] key. The MODE menu will appear.

MODE MENU

: CHART 1	: CHART 2	: CHART 3	: CHART 4	:	:
: ASTRO 1	: ASTRO 2	: ASTRO 3	: ASTRO 4	:	:
: DATA	: DUAL	: TIMER	: DATA	:	:
: LOGGER	: SPEED	: START	: PLAYBACK	:	:

- Press the soft key above either "CHART 1", "CHART 2", "CHART 3" or
  "CHART 4". For a ten-channel configuration these are the layouts:

Astro 1 - provides a 200mm wide grid with ten channels.
Astro 2 - provides two 100mm wide grids each with five channels.
Astro 3 - provides five 40mm wide grids each with two channels.
Astro 4 - provides ten 20mm grids each with 1 channel.

- Press the [RUN/HALT] key to halt the chart .

Later on, we'll program these keys to contain customized charts.

CHANGE GRID

The Dash 10 allows you to design exactly the grid you want. Let's try to design a grid.

- Press the [SYS] key. The SYS menu will appear.

SYS MENU

: MODIFY	: SETUP	: SETUP	: SYSTEM	: DISK	:
: CHART	: CAPTURE	: TRIGGER	: I/O	: I/O	:
: DLOGGER	:	: TOP OF	: PAGE		
: CHANS	:	: FORM	: EJECT	: EXIT	:

- Press the soft key above "MODIFY CHART". The MODIFY CHART menu
  will appear.
- Press the soft key above "CHANGE GRID". The CHANGE GRID menu will
  appear.
- Press the soft key above "TYPE" to change between standard and t -based grids.
  standard -grids are printed in standard 5mm increments and are not
  synchronized with the recorders timing marks.
  t-based - grids are time-based grids printed with divisions that
  are synchronized to the recorder's timing marks.
- Press the soft key above "LAYOUT GRIDS". The LAYOUT GRIDS menu will
  appear.

LAYOUT GRIDS MENU

: CHANNEL	: STATUS	: SIZE	:	: POSITI ON	:
: MAJORS	:	: MINORS	:	: EXIT	:

By pressing the soft keys above/below "CHANNEL", "STATUS", "SIZE",
"POSITION", "MAJORS" and "MINORS", and turning the encoder wheel to get
the desired settings, you can customize your grids. Let's practice setting up grid.

- Press the soft key above "CHANNEL".
- Turn the encoder wheel until channel 2 is selected.
- Press the soft key above "STATUS" until it reads ON. Make sure that channel
  2 is the only channel where the "STATUS" is ON.
- Press the soft key above "SIZE".
- Turn the encoder wheel until 100mm is selected. This changes the size of the
  grid to 100mm.
- Press the soft key above "POSITION".

- Turn the encoder wheel until 40mm is selected. This selects a chart location which can range from 1 to 250 mm where 1mm is near the bottom (right) and 250mm is near the top (left).
- Press the soft key below "MAJORS".
- Turn the encoder wheel until 10 is selected. There will be 10 major divisions in your grid.
- Press the soft key below "MINORS".
- Turn the encoder wheel until 2 is selected. There will be 2 minor divisions between each major division.

Congratulations! You have now made a custom grid for channel 2. Press the [RUN/HALT] key to start the chart.

STORING CHARTS AND SETUPS

It is important to understand that there is a difference between charts and modes. Basically, a chart is the way information is presented on the paper, such as: text location, event location, wave location, waveform width and grid on/off.

A setup consists of t he specific parameters used in a recording setup, as well as the soft key chart settings. These parameters include: zero and gain settings, speed settings, edit settings and trigger settings. Setups are saved to floppy disk.
(See the Operations Manual for information on how to save modes.)

Let's demonstrate how charts are saved to soft keys.

- Press the [RUN/HALT] key to halt the chart.
- Press the [MODE] key. The MODE menu will appear.
- Press the soft key above "CHART 1 - ASTRO 1". The default chart Astro 1 saved under this soft key will be running. Notice the layout of the chart.
- Press the [RUN/HALT] key to halt the chart.
- Press the [SYS] key. The SYS menu will appear.
- Press the soft key above "MODIFY CHART". The MODIFY CHART me nu will appear
- Press the soft key above "CHANGE GRID". The CHANGE GRID menu will appear.
- Press the soft key above "LAYOUT GRIDS". The LAYOUT GRIDS menu will appear.
- Press the soft key above status until it reads off. Make sure the grid s for all the channels have the status set to off.
- Press the [MODE] key. The MODE menu will appear.
- Press the soft key above "CHART 1 - ASTRO 1". Notice that now the grid is off.
- Press the [RUN/HALT] key to halt the chart.

The Dash 10 automatically saves the chart to the soft key that you were previously running.

4. SETTING UP ZERO AND GAIN

The [Z/G] key (zero and gain) is used to set a variety of parameters such as; selecting a voltage range for the chart, selecting a chart location for the zero baseline of the waveform input signal, suppressing up to 500 VDC of the waveform input, choosing between rms and peak to peak recording modes, grounding the input signal, enabling/disabling filtering, calibrating each channel and scaling waveform data to engineering units of your choice.

• Press the [Z/G] key. The Z/G menu will appear.

Z/G MENU

```
: CHANNEL      : CAL          : DC/GND       : MODE          : FILTER       :
    Channel    :  dc                          : pk-pk              off

: RANGE        : ZERO         : ZS           : more           : EXIT         :
```

In order to change the parameters of a specific channel, press the soft key above "CHANNEL" and turn the encoder wheel to select a channel.

FILTER

• Press the soft key above the "FILTER" to toggle the filter between on/off.

DC/GND

• Press the soft key above the "DC/GND" to toggle between dc and gnd.

MODE

The Dash 10 can record data either using the peak to peak recording method or the root mean square method.
• Press the soft key above "MODE" to toggle between pk-pk and rms.

RANGE

The Dash 10 has an input range of 50mv to 500V peak. To change the range of a specific channel:
• Press the soft key below "RANGE". The range parameter will be blinking.
• Either turn the encoder wheel or use the alphanumeric keypad to select a voltage range and press enter.

ZERO POSITION

The Dash 10 has the zero parameter which enables the zero baseline to be positioned.
• Press the soft key below "ZERO". The zero position parameter will be blinking. Turn the encoder wheel or use the alphanumeric keypad to select a percentage. The percentage that you specify is the percentage of the selected full-scale voltage range that will be applied to the baseline. 0% is in the middle of the grid and +/- 50% is at the left and right grid limits. Positive values shift the baseline to the left and negative values shift the baseline to the right.

ZERO SUPPRESSION

When a waveforms input signal contains an unwanted direct current (DC) component, zero suppression can be used to remove up to -500V to 500V, depending on the channels range. See the Operations Manual for more information.
• Press the soft key below "ZS".
• Turn the encoder wheel or use the alphanumeric keypad to select a voltage and press enter.

MORE...

The soft key marked "more" scrolls to the next menu selections for the zero and gain.
• Press the soft key below "more".

CHANNEL MASTER

Channel master is used when you have a channel set up to specific parameters and would like to have all of the recorders channels set at these parameters. Instead of changing the parameters on each separate channel:
- Press the soft key below "CHANNEL MASTER".
  The CHANNEL MASTER menu will appear.
- Turn the encoder wheel to select the channel that you want all of your channels parameters to be set to.
- Press the soft key below "BEGIN".
  Congratulations! All your channels will now have the same parameters as the selected channel.
- Press the soft key below "EXIT".
- Press the soft key below "more" to return to the first Z/G menu.
- Turn the encoder wheel to verify that all the channel parameters are the same.

For information on how to use User Scaling see the Operations Manual.

5. ENTERING TEXT ANNOTATION

The Dash 10 is equipped with thirty 128 character channel annotation buffers, one 128 character on demand annotation buffer and one system log buffer. The thirty 128 character annotation buffers and the on demand buffer can be moved to any of the 95 positions across the chart.

CHANGING BUFFERS AND LOCATION

Text annotation is easy to enter. Press the front panel [EDIT] key. The EDIT menu will appear. The word Syslog under "BUFFER" should be blinking. This indicates the attribute that you are working on (in this case it is the "SYSLOG BUFFER"). Turn the encoder wheel to change the buffers. Notice that there is one Syslog buffer, 30 channel buffers labeled 1 - 30 and one Demand buffer.

- Turn the encoder wheel until 3 appears under "BUFFER".
- Press the soft key above "STATUS". This toggles the buffer status between ON and OFF. If the "STATUS" is OFF the buffer WILL NOT print.
- Press the soft key above "LOCATION". The number under "LOCATION" will blink. Turning the encoder wheel will change the location of BUFFER 3.

ENTERING TEXT

Let's try to enter some custom text.

- Press the [RUN/HALT] key to stop the chart.
  You should still be in the EDIT menu, if not press [EDIT] and make sure that you are in BUFFER 3.
- Press the soft key below "EDIT".
- The text "Channel #3" will appear in BUFFER 3.
- If you want to type in upper case letters press the soft key below "CASE" until *CAPS* appears on the display.
- Using the alphanumeric keypad press the key until the blinking cursor is 2 spaces past the text "Channel #3".
- Type the letters "TEST".
- Press the soft key below "ACCEPT".
- Press the [RUN/HALT] key.
  Notice that BUFFER 3 now reads "Channel #3 TEST" on the chart.

Congratulations! You now know how to edit/add text as well as change the location.

6. SETTING UP DATA CAPTURE & PLAYBACK

For earlier models of the Dash 10, data capture was an option. Dash 10 recorders with data capture were known as the Dash 10M. In later years, data capture became a standard feature of the Dash 10, and the model Dash 10M was no longer referenced. If your model does not have data capture, the menus for data capture will not be present. Data capture allows you to capture and replay 512 kSamples of data per channel. In order to complete a data capture you must have the data capture memory and software, define and turn on triggers and arm the system to respond to triggers.

A number of parameters have to be defined in order to setup a dat a capture, such as:

Sample Rate
Trigger Position
Record Size
Capture Control
Let's explore the Setup Capture menu:

- Press the [SYS] key. The SYS menu will appear.
- Press the soft key above "SETUP CAPTURE".
  The SETUP CAPTURE menu will appear.

SETUP CAPTURE MENU

: BRD	: SAMPLE	: TRIGGER	: RECORD	: CAPTURE	:
: 1	: RATE	: POSITION	: SIZE	: CONTROL	:
SAMPLE RATE					
			: more	: EXIT	:

It is important to make sure that the data capture board that you want to use is setup to "on". If it is not set to "on" the data capture will not occur.

- Press the soft key above "BRD" until the data capture board you want to setup is selected. Select BRD 1. You will only have a choice of BRD1, unless your recorder is equipped with the expansion boards with memory option (EXP20M OR EXP30M).
- Press the soft key below "more".
- Press the soft key above "BRD1" to toggle between on and off. Make sure BRD1 is on.
- Press the soft key below "more" to return to the SETUP CAPTURE menu.

Next you can change the sample rate at which the data will be captured.

- Press the soft key above "SAMPLE RATE".
- Turn the encoder wheel to change sample rates. Select 125kH z as the sample rate.

Next you can select the record size. Record size indicates the total amount of data capture memory allocated to the next data capture.

- Press the soft key above "RECORD SIZE".
- Turn the encoder wheel to see the different record sizes. Record sizes will vary depending how many channels you wish to capture. For example, a record size of 11 X 558k indicates that 10 channels and events are being captured to a record containing 558 kilosamples for each channel and events. The record size that is displayed on your recorder depends on what the value was when your machine was powered down.

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You are able to change the number of channels that you want to capture.

- Press the soft key below "more".
- Turn the encoder wheel to see which channels/events are enabled or disabled. Disable all channels except channel 1 by pressing the soft key under "DISABLE", for each channel you want disabled. The same procedure is used for enabling channels.
- Press the soft key below "more" to return to the SETUP CAPTURE menu.
- Press the soft key above "RECORD SIZE". Notice that the record size choices are now either 1 X 768k of 1 X 6144k.

Remember, the first number of the record size indicates the number of channels or events that are being captured and the second number indicates the amount memory that is allocated for the data capture per channel or event.

Now, we are going to try a simple capture using the manual trigger.

- Press the [SYS] key. The SYS menu will appear.
- Press the soft key above "SETUP TRIGGER". The SETUP TRIGGER menu will appear.

<u>SETUP TRIGGER MENU</u>

: MANUAL	: HOST	: WAVE	: EXTERN	: PERIODIC	:
: on	: off	: off	: off	: off	:
: SETUP	: SETUP	:			
: WAVE	: PERIODIC	:		: EXIT	:

- Turn the manual trigger to on by pressing the soft key above "MANUAL" until "on" is displayed.
- Turn the other triggers - Host, Wave, External and Periodic - to "off" by pressing the soft key above "HOST", "WAVE", "EXTERNAL" AND "PERIODIC" until "off" is displayed.
- Press the [ARM] Key. The recorder is now armed and is in the pre-trigger phase.
- Press the [TRIG] key in order to cause the recorder to trigger and complete the data capture. CAPTURE COMPLETED is displayed when the capture is finished.

Congratulations! You have just completed a data capture. Now play the capture back.

- Press the [MODE] key. The MODE menu will appear.
- Press the soft key below "DATA PLAYBACK". The PLAYBACK MODE menu will appear.
- Press the soft key below "SETUP PLAYBACK". The SETUP PLAYBACK menu will appear.
- Press the soft key above "SET DEVICE".
- Turn the encoder wheel to select the different output device options. Select the "display and chart" option.
- Press the soft key below "EXIT".
- Press the soft key above "SET FORMAT".
- Turn the encoder wheel until the "Output format:" is set to chart 2. The data will now be played back according to the chart format saved under the CHART 2 soft key in the MODE menu.
- Press the soft key below "EXIT".
- Press the soft key below "EXIT". You should now be back in the PLAYBACK MODE menu.
- Press the soft key below "RUN PLAYBACK".

7. SAMPLE EXERCISE   (9 Volt Battery Test)

Items needed: 9 Volt battery. Signal input leads.

I. Real-time Monitoring

Monitor the voltage of a 9 Volt battery.

Set up the channel so that when there is no signal, the waveform trace will be at the bottom of the channel and when the 9 Volt signal is applied, the waveform trace will be near the top of the channel.

ACTION
This column lists the sequence of steps to set up a channel to record the 9 Volt battery, set up a data capture, trigger the capture, and playback the captured data. Be sure to follow each step in order to achieve a better understanding of how the Dash 10 works.

HOW TO
*Every action step needed is listed in this column. Menu keys are listed in bold letter enclosed by brackets. For example, **[SYS]** is the black System key to the left of the display.*

For parameters that have many choices available, the Dash 10 uses an encoder wheel that you turn to make your selection. As you rotate the encoder wheel, you will see the value of the parameter changes in the display. In this exercise, the encoder wheel values that you will select are listed in bold font.

ACTION

HOW TO

ACTION	HOW TO
Create a chart with one signal	**[SYS] [MODIFY CHART] [AUTOCHART] [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* **1** **[NEXT>]** **[NEXT>]**
Select Chart with Channel 1	**[MODE] [CHART 1]**
Set speed to 5 mm/sec	**[5] [SEC]** *Common speeds have dedicated keys on front panel of Dash 10.*
Stop the chart paper	**[RUN / HALT]**
Set Channel #1 to be 0 – 11 Volts FS	**[Z/G]** *Turn encoder wheel to Channel* **1**. **[RANGE]** *Turn encoder wheel until range is set to* **11** *Volts.* **[ZERO]** *Turn encoder wheel until Zero Position =* **-50%**.
Run the chart	**[RUN / HALT]**
Input battery voltage into Channel # 1	*Input signal into red and black banana jacks for Channel #1. Observe the signal deflection goes from baseline on the bottom of the chart to near the top.*
Stop the chart paper	**[RUN / HALT]**
Remove battery voltage	

Proceed to the next page to set up data capture.

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II. Data Capture

Note: On some models, data capture was an option. If your model does not have data capture, the menus for data capture will not be present.

Capture data when the battery voltage is applied. Set up a single data capture for 7.15 seconds. Capture almost one second of pre-trigger data to show what the signal looked like before the battery voltage was applied. For this capture, a waveform trigger will be used to detect when the battery voltage is applied.

ACTION	HOW TO
Enter Data Capture Setup	**[SYS] [SETUP CAPTURE]**
Set memory for eight segmented captures	**[RECORD SIZE]** *Turn encoder wheel so that Record Size =* **11 X 69K**. *If not, press* **[more]** *key. Turn encoder wheel and observe that events (*"**evts**"*) as well as all ten channels are enabled. Press softkey* **[ENABLE]** *for those channels and events that are disabled. Press* **[more]** *to return to previous menu.*
Set sample rate to 10 kHz	**[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 the signal. Turn encoder wheel until sample rate is* **10 kHz**.
Set trigger window to 10%	**[TRIGGER POS]** *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%**.
Be sure auto-triggering is OFF	**Autotrig:** *Autotrig is "self-triggering". That is, the Dash 10 triggers itself as soon it is armed for a data capture.* *If auto-triggering is ON, toggle to* **OFF**.
Set capture for one record	**[CAPTURE CONTROL]** *You can capture one record, or re-arm for more captures. Turn encoder wheel for* **single capture**.
Enable waveform triggering	**[WAVE]** *Waveform should be toggled to* **ON** *position.*
Pick waveform(s) for triggering	**[SETUP WAVE]** *The display shows the* **OR** *trigger settings. Set the* **OR** *trigger to read* **OR:01**. *If more than one channel shows, press* **[DELETE]** *to remove them. If the remaining channel is not* **01**, *turn encoder wheel to select* **01**. *Note – If the display lists "***waveAND***" in the* **OR: trigger settings**, *press* **[DEL AND]** *to remove it.*
Set up the level for triggering	**[LEVELS]** *Set* **[WINDOW]** *to outside. Press* **[LOW]** *level and turn encoder wheel until the level is* **off**. *Press* **[HIGH]** *level and turn encoder wheel until level is* **80%**. **[EXIT] [EXIT] [EXIT]**.
Run the chart	**[RUN / HALT]**
Arm for capture	**[ARM]** *This key is located near the encoder wheel. The* Dash *10 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 display and the chart.* *Note: you do not need to run the chart when you capture data.*
Stop the paper	**[RUN / HALT]**
Exit Data Capture Menu	**[EXIT MENU]**

Proceed to the next page to review and playback the data capture.

III. Data Review and Playback

Data capture records can be reviewed on the display as well as on the chart paper. During review, the timebase can be expanded or compressed to give appropriate detail of the signal.

ACTION	HOW TO
Enter Data Capture Playback	**[MODE] [DATA PLAYBACK]**
Setup Playback	**[SETUP PLAYBACK]**
Enable printing of record info	*Toggle* **[REPORT]** *key to* ***on****. This will print out the header information.*
Show where the trigger point is	*Toggle* **[TrigMark]** *key to* ***on****. This will highlight the trigger point with a line across the chart.*
Play back all of the capture	**[MODIFY WINDOW]** *Press the [100%] key.* **[EXIT]**
Compress the playback	**[SET MAGNIF]** *Turn encoder wheel so that expansion is* ***X 1/8****.*
Select chart format for playback	**[SET FORMAT]** *Be sure output format is* ***Chart 1****.*
Play back data to paper and display	**[SET DEVICE]** *Turn encoder wheel so output device reads "****display & chart****".* **[EXIT]**
Play out data capture	**[RUN PLAYBACK]**
Zoom in on the trigger point	**[SETUP PLAYBACK] [MODIFY WINDOW]** *With* **[UNITS]** *set to percentage, press the* **[START]** *key and turn encoder wheel to* ***8%****.* *Press the* **[END]** *key and turn encoder wheel to* ***12%****.* **[EXIT]**
Expand the playback	**[SET MAGNIF]** *Turn encoder wheel so that expansion is* ***X 2****.* **[EXIT]** **[EXIT]**
Play out data capture	**[RUN PLAYBACK]**

… this completes the exercise.

Throughout the setup of the Dash 10, you can consult the manual for additional help. This Quick Start Guide provides the basic information for operating the Dash 10. Under many of the menus, you will find additional choices for more advanced capabilities of the Dash 10, and the Operations Manual provides information on utilizing these features.
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