VivoMetrics®
Government Services
MONITORING LIFE®

VivoResponder™

The VivoResponder™

The VivoResponder™ with LifeShirt® technology is a lightweight chest strap with embedded sensors that monitors breath rate, heart rate, activity, posture, and skin temperature. This system is designed to help first responders improve performance by increasing awareness of physiologic intensity, recovery, and fitness, and understanding of the relationship between strenuous activity and physiology.

Real-time life-sign information is transmitted from the VivoResponder™ to a remote location where VivoCommand software, running on a PC, displays real-time vital signs of each team member's physiological data and can be saved for analysis.

This system manual shows the simple steps to set-up, use and maintain the VivoResponder™ vital sign monitoring system.

⚠ **CAUTION**: If user has a pacemaker, it is necessary to consult with his/her physician and/or the pacemaker manufacturer prior to use of the VivoResponder™ to ensure that it will not interfere with the proper functioning of the pacemaker.

⚠ **CAUTION**: If user has a pacemaker, pacemaker pulses will count as heartbeats.

NOTE: The VivoResponder™ is not for use in medical applications. Before starting any strenuous exercise, user should always consult his/her physician.

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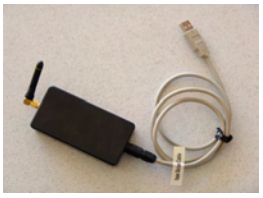
The VivoResponder™ Kit

VivoResponder™ Attaché Case

VivoResponder™ Chest Strap

VivoResponder™ Base Station USB RX with USB Cable



VivoResponder™ Sensor Module RX
(Shipped INSIDE the Holster)

Holster with Belt Clip

Battery Charger

VivoResponder™ Shoulder Strap

Wash Bag

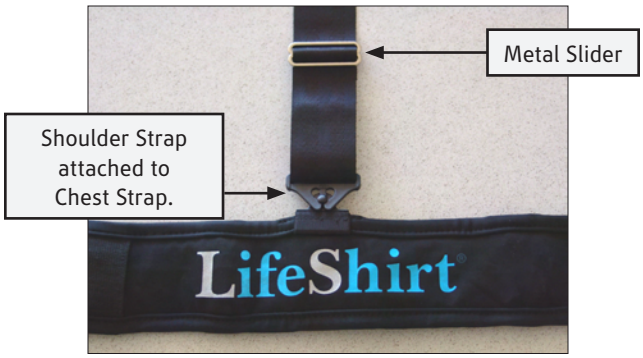
Polar Wearlink
(removable)
Factory-installed in the Chest Strap

CD and Set-Up Guide

Put on the VivoResponder™

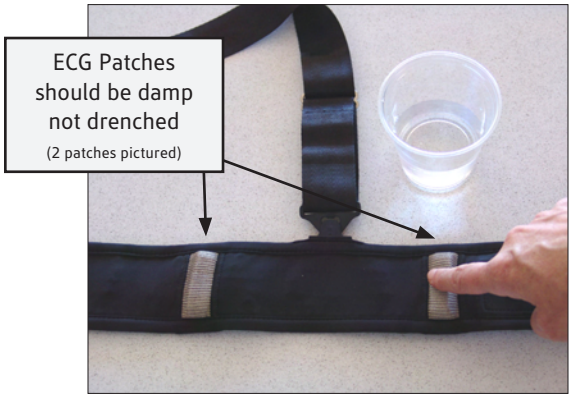
1. Attach the Shoulder Strap

   Snap the Shoulder Strap onto the front and back of the Chest Strap. The metal slider should be closer to the front.



2. Moisten the ECG Patches

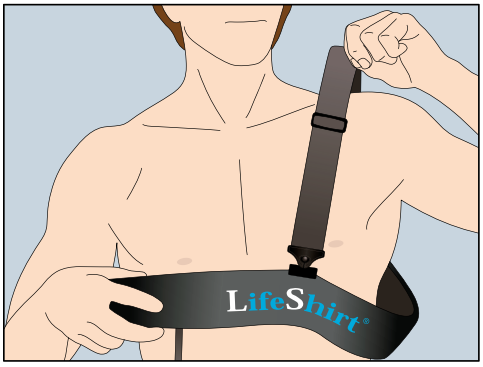
   Moisten your finger with water and wet each of the three raised patches of silver fabric on the back side of the Chest Strap.



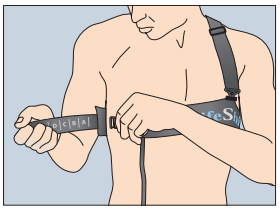
3. Put on the VivoResponder™

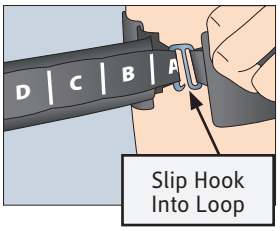
   a. Slip the Shoulder Strap ***over one shoulder***— **NOT OVER YOUR HEAD**.

   Slip arm through Shoulder Strap

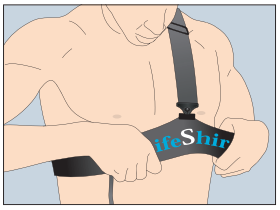


   b. Hold the letter end of the Chest Strap and slip the hook through the loop that fits. Chest Strap should be snug, but not too tight. Each letter corresponds to a loop.

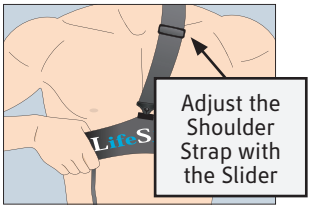




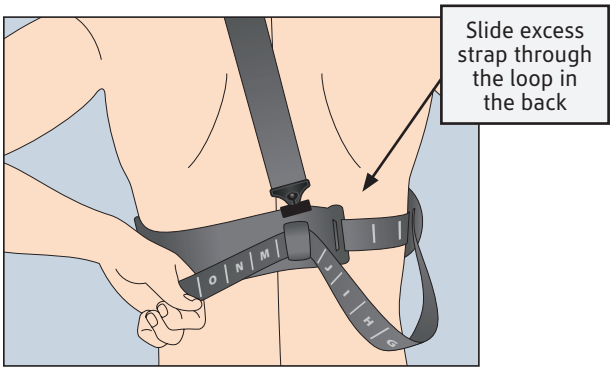
   c. Move the VivoResponder™ Chest Strap until the "S" in "LifeShirt" on the Chest Strap is centered on your sternum.



   d. If needed, adjust the Shoulder Strap with the slider to hold the Chest Strap in place.



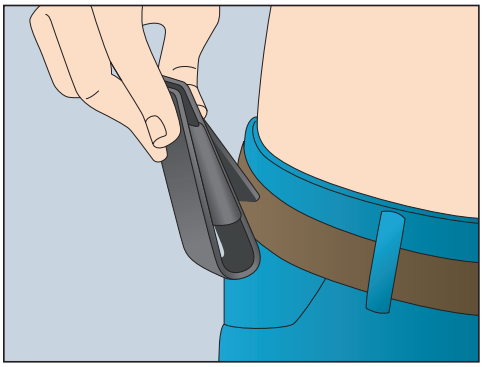
   e. The Chest Strap is extra long to accommodate users of various sizes. If there is excess, thread it through the loop on the back.



***NOTE**: If you are unsure about fit, see Appendix A.*

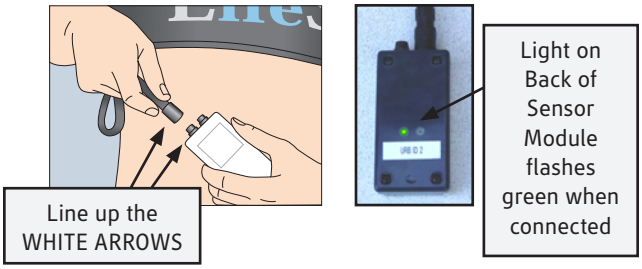
Put on the VivoResponder™

4. Attach the Holster to your belt

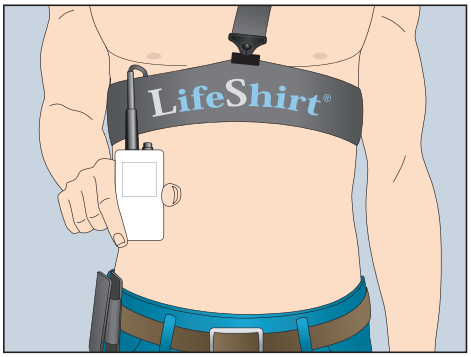


5. Plug in the Sensor Module

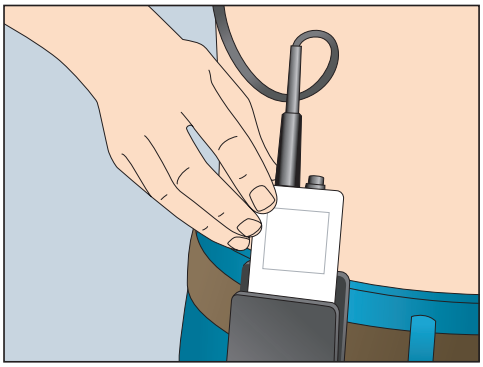
   a. Line up the white arrows on the strap cable connector and the Sensor Module; snap together. When connected, the LED flashes green on the back of the Sensor Module.



   b. Stand upright and hold the Sensor Module upright for 10 seconds.



   c. Slide Sensor Module into the Holster in the same upright position.



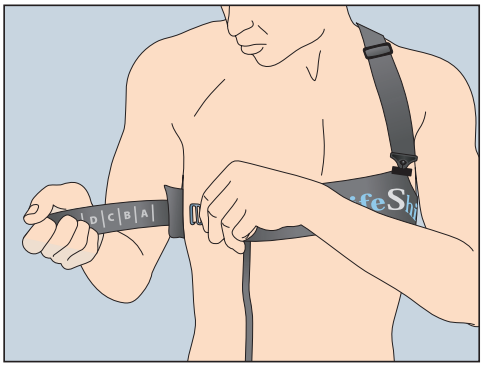
   d. The VivoResponder™ is now calibrated to your body position and is operational. There is no other "On Switch."

Operation Complete

You are now ready to start collecting life-sign data.

Ending a Monitoring Session

1. Disconnect the External Radio by gently sliding the locking ring back.
2. Disconnect the Sensor Module by gently sliding the locking ring back.
3. Unsnap the shoulder strap by tilting the suspender hook in the center of your chest.
4. Using two hands pull the VivoResponder™ Chest Strap slightly away from your body until the dampened ECG pads are no longer in contact with your skin.
5. Rotate the strap around your body so that the hook sits in front of your chest.
6. Slide the hook out of its loop and remove the strap.



7. Replace all the VivoResponder™ components in the Attaché Case for storage or return.

Operation Complete

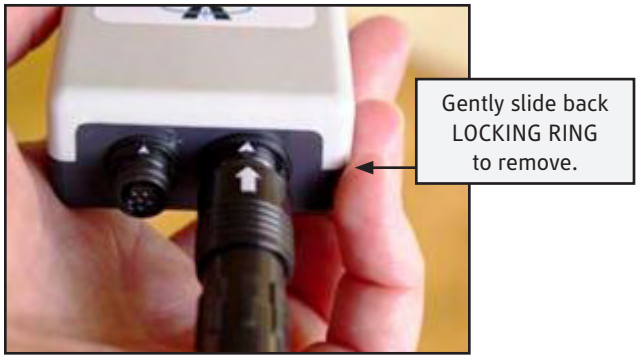
Care and Maintenance

Recharging the Battery

1. Connect the Battery Charger to a 120V AC power outlet and plug the connector into the Sensor Module.

2. Line up the white arrows on the connector and the Sensor Module and gently push. You will hear a "click" when it is connected correctly and the charge indicator LED will illuminate yellow.

   NOTE: *You cannot charge when the Chest Strap is connected. The charger and the Chest Strap use the same connector on the Sensor Module.*



3. When charge is complete, the left LED will turn Green.

Yellow Light:
Charging

Green Light:
Charging Complete

4. Remove the connector by gently lifting the Locking Ring at the base and sliding the connector away.

   NOTE: *The system should come fully charged. It takes 4 hours for a complete charge when totally empty. A full charge will last approximately 220 hours when plugged into an external radio or data logger or approximately 48 hours with an internal radio.*

Cleaning the System

1. The VivoResponder™ Chest Strap may be laundered in a washing machine:
   - Gentle cycle
   - Cold Water
   - Standard detergent

IMPORTANT:
Always use the wash bag when laundering

DO NOT USE BLEACH
DO NOT DRY CLEAN
HANG DRY ONLY

2. Disconnect and store the Sensor Module.

3. Detach the Shoulder Strap

Twist the snap outward from chest to unfasten.

4. Unsnap and remove the Polar Wearlink from under the elastic, one snap at a time (there are two snaps).

Unsnap the Polar Wearlink and remove prior to washing.

Polar Wearlink:
Front (*top*) and Back (*bottom*)

5. Plug the end of the connector with the wash cap.

5. Thread the cable through the Wearlink elastic, twice, to hold it in place during the wash.

Chest Strap ready to be placed in the wash bag.

7. Place the Chest Strap flat into the wash bag and zip it up.

Drying the Strap

1. Hang dry only. Do not dry the Chest Strap in machine or with hot air.

IMPORTANT:
DO NOT HEAT OR TUMBLE DRY THE STRAP

Cleaning the Sensor Module

1. Wipe the Sensor Module with a damp cloth.

CAUTION: *The VivoResponder™ Sensor Module is water resistant, but it is not intended to be sumerged in water.* **DO NOT SUBMERGE IN WATER.**

CAUTION: *Do not disassemble the Sensor Module; this will void the warranty.*

Re-install the Polar Wearlink

1. On the outside of the VivoResponder™ strap (to the left of the printed word—LifeShirt) find the elastic band with two (2) female snaps underneath.

2. Slide the Wearlink under the elastic so that the word—Polar—is facing the same direction as the word—LifeShirt.

Slide the Wearlink under the elastic, then snap in place.

3. Snap the Wearlink onto the band one snap at a time, listening for the snapping sound to verify it is properly attached.

Storing and Shipping

For best results, store and ship all VivoResponder™ components in their original packaging.

Appendix A: Sizing Chest & Shoulder Straps

Sizing the Chest Strap

1. The Chest Strap comes in three sizes:

   A. ***Standard***: S thru 3XL (*Provided in the kit.*)

   B. ***Petite***: XS
   (*Must be ordered separately or replaces standard strap.*)

   C. ***Long Tail***: Cable is extra long
   (*Must be ordered separately or replaces standard strap.*)

2. Use a tape measure to measure chest just below the sternum.

3. Chest measurement determines which Hook Loop to use with the strap. Refer to the chart.

CHEST SIZE (inches)	HOOK LOOP LETTER
32 or less	Petite Strap
33-34	A
35-36	B
37-38	C
39-40	D
41-42	E
43-44	F
45-46	G
47-48	H
49-50	I
51-52	J
53-54	K
55-56	L
57-58	M
59-60	N
61-62	O
63-64	P

4. Using the sizing chart **above**, find the ***hook loop letter*** that corresponds to ***chest size***. If you fall between sizes go to the size below.

Sizing the Shoulder Strap

1. The Shoulder Strap is available in three different configurations:

   A. ***Standard*** (*Provided in the kit.*)

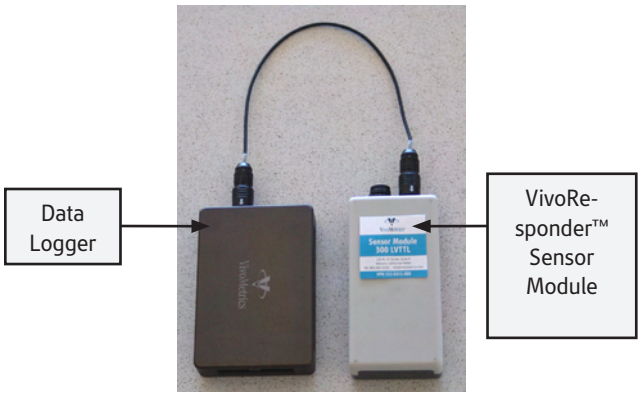
   B. ***XL***
   (*Optional; swap the standard Shoulder Strap by contacting VivoMetrics, Inc. Customer Service at 800-631-4445*)

   C. ***Velcro*** adjustment instead of slider.
   (Available as an accessory by contacting VivoMetrics, Inc. Customer Service at 800-631-4445)

Appendix B: Connecting to a Data Logger

Data Logger

If you are using the VivoResponder™ with VivoResponder™ Sensor Module LVTTL and a Data Logger, refer to the Data Logger manual.

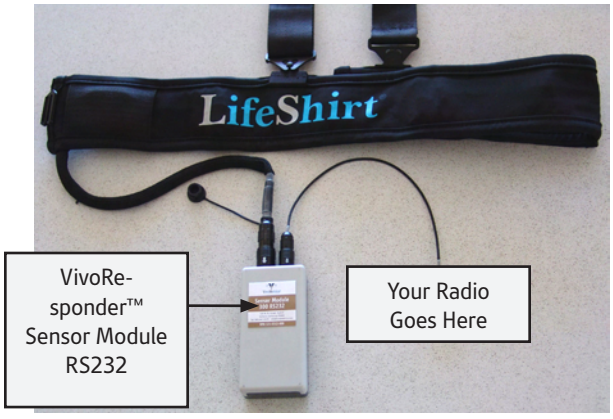


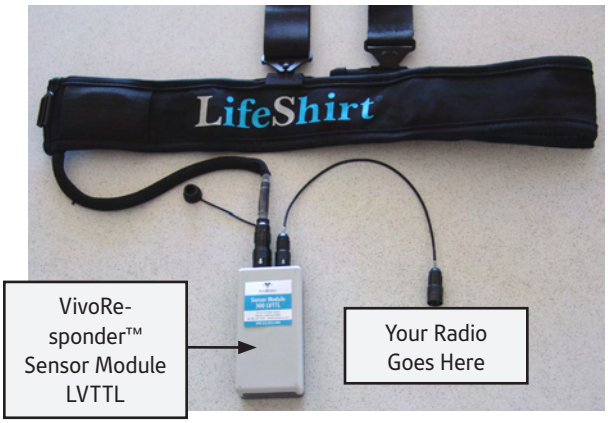
External Radio

If you are using an external radio follow the instructions below to connect.

NOTE: If you are using an external radio, you either have a Sensor Module RS232 or a Sensor Module LVTTL, depending on the external radio system you are plugging into.

1. Locate the second connector on the top of the Sensor Module.
2. Plug the supplied cable into the radio.
3. Plug the other end of the cable into the VivoResponder™ Sensor Module.





4. Turn on your external radio.
5. Refer to the separate radio instruction manual for further information on your equipment.

Cautions

⚠ Cautions

- Read this manual before using the VivoResponder™ System.
- If you have a Pacemaker, the Sensor Module will count Pacemaker Pulses as heartbeats.
- Consultation with your physician and/or the pacemaker manufacturer prior to use of Vivometrics is necessary to ensure that it will not interfere with the proper functioning of the pacemaker.
- Always follow the recommended washing instructions to clean the VivoResponder™ Chest Strap in the VivoResponder™ System Manual.
- Do not use the VivoResponder™ System on an airplane. This product has not been tested to FAA guidelines.
- Do not engage in water sports, such as swimming, while wearing the VivoResponder™ System. May cause electric shock.
- Do not use the VivoResponder™ System in extreme environments (below -14°F, or above 158°F).
- Use only approved chargers to charge the Sensor Module battery.
- Do not disassemble the Sensor Module.Do not heat the Sensor Module over 163°F or incinerate it.
- Remove the VivoResponder™ System before using a defibrillator. May cause electric shock.
- Arrange all power cords and cables so that they do not constitute a hazard.

Customer Support

Limited 90-Day Warranty

VivoMetrics, Inc. warrants to the original consumer/purchaser that this product will be free from defects in material or workmanship for 90 days from the date of purchase.

- Warranty does not cover damages due to misuse, abuse, accidents or negligence of the precautions; improper maintenance, cracked or broken cases.
- Warranty does not cover damage or consequential damage caused by service not authorized by VivoMetrics, Inc.

During this warranty period (90 days), the product will be either repaired or replaced (at your distributor's option) without a charge.

VivoMetrics Customer Support

Telephone:	800-631-4445 (inside U.S.A.) 805-667-2225 (outside U.S.A.)
Fax:	805-667-6646
Email:	help@vivometrics.com

Cautions and Specifications

Specifications

ENVIRONMENTAL LIMITS

Altitude:	26,000 ft.
Humidity:	100%
Temperature:	-14°F to 150°F
Operating Temperature:	85C
Measurement Temperature:	0C to 90C 0.3 C accuracy
Storage:	85C to 100C
Distance to base:	maximum 20 meters

ViviResponder™ and transmitter can be immersed up to 1 meter of water. Do not immerse for more then 30 mins

BATTERY

Power Req. (Battery Charger):	120V, 60Hz, 15W
Battery Capacity:	Lithium-ion, 1950mAh
Battery Voltage:	3.7V nominal, (Li-Ion Curve)

CHEST STRAP

Fabric Composition:	84% nylon, 16% spandex
Strap Weight (without Wearlink):	6.6 oz. (187grams)
Strap Weight (with Wearlink):	7.5 oz. (212 grams)
Strap Dimensions:	53"x 2.75"x 0.25"
Fits sizes:	Small to 3XL
Washing Temperature:	Cold
Drying:	Hang Dry

SENSOR MODULE

Dimensions:	3.75" x 1.75" x 0.74"
Weight:	4oz.
Connector type and model:	Hirose
Housing:	ABS Plastic, injection molded

POLAR WEARLINK HEART RATE RECEIVER, LD

Wearlink coded data bursts are inductively captured by the URB 2.1. Burst timing is measured using 1mSec resolution. Integer valued heart beat in BPM is produced from a running average of eight beats. If no beat is observed in 8 seconds, the averaged value is forced to zero and the OK bit is set to false. The valid output data range is 1-255 with an upper value (default=255) max safe HR value.

Digitizing rate:	1Khz
Digital Resolution:	n/a

POLAR WEARLINK HEART RATE MONITOR

Input Dynamic Range:	+/- 5.8 mV
Input Offset Dynamic Range:	+/- 300 mV
Input Lead-Off Sensing Current:	0.055 uA
Input Impedance:	60 M ohms
Input Noise:	17 mV rms
Common-mode Rejection Ratio:	83 dB @ 60 Hz 70 DB @ 120 Hz
Gain Stability, 8 hours:	< 1% deviation
Baseline Stability, 8 hours:	< 1% deviation
Frequency Response:	0.67 to 40 Hz, -3 dB
Timing Accuracy:	0.012%

SAMPLING RATE

ECG:	200 HZ
R-Wave:	1 KHz
Accelerometer:	16Hz
Plethysmographs:	50 Hz

MEASUREMENT RANGES

Heart Rate:	15BPM to 208 BPM
Respiration:	3 to 75 valid breaths per minute
Position:	+/- 2 g vertical +/- 2 g horizontal (side-side) +/- 2 g horizontal (front-back)

ACCURACY

Respiration:	+/- 5% of rate or 2 breaths per minute, whichever is greater.
Heart Rate:	+/- 10% or +/- 5% BPM
Position:	8 bits
Activity:	8 bits

FILTERS

Heart Rate:	8 beat rolling avg. R-R inst. time
Respiratory Rate:	60 second rolling average

SKIN TEMPERATURE SENSOR, LD

Sample rate:	10Hz
Data Rate:	1 Hz
Data Reference:	To a 0.1% 25°C set point, Values of 0~1023 are used with implied decimal point (theoretical range of 0~102.3°C).
Valid measurement range:	20°C to 70°C

ACCELEROMETER

+/-2G mapped to arbitrary units with 255 range.
Mapping linearity is not calibrated.

VivoMetrics®
Government Services
MONITORING LIFE®

VivoCommand Software

SET-UP GUIDE
VIVORESPONDER™
VIVOCOMMAND
BASE STATION USB RX
DATA LOGGER
WARRANTY & DISCLAIMER

VivoCommand Software

VivoCommand Software is designed specifically for use with the VivoResponder™, a lightweight chest strap with embedded sensors that monitors breath rate, heart rate, activity, posture, and skin temperature. This system is designed to help responders and athletes improve performance by increasing awareness of physiologic intensity, recovery, and fitness, and understanding of the relationship between strenuous activity and physiology.

Real-time life-sign information is transmitted from the VivoResponder™ to a remote location where VivoCommand Software, running on a PC, displays real-time vital signs of each team member's physiologic data and can be saved for analysis.

VivoCommand Software is easy to use and customize to meet your physiologic monitoring needs.

CAUTION: If user has a pacemaker, it is necessary to consult with his/her physician and/or the pacemaker manufacturer prior to use of the VivoResponder™ to ensure that it will not interfere with the proper functioning of the pacemaker.

CAUTION: If user has a pacemaker, pacemaker pulses will count as heartbeats.

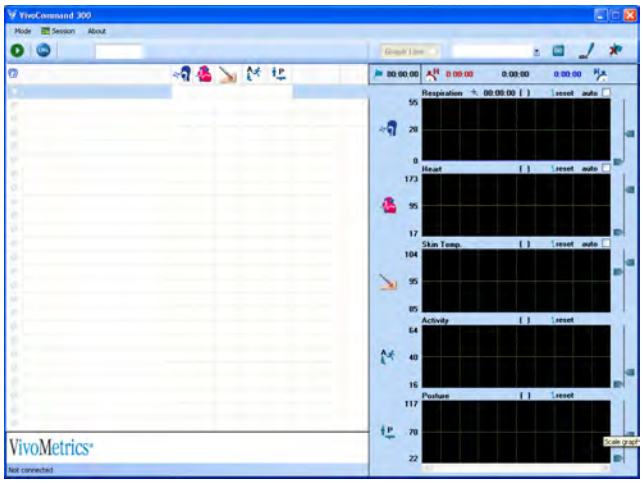
***NOTE**: The VivoResponder™ is not for use in medical applications.*
Before starting any strenuous exercise, user should always consult his/her physician.

VivoCommand Software—Table of Contents

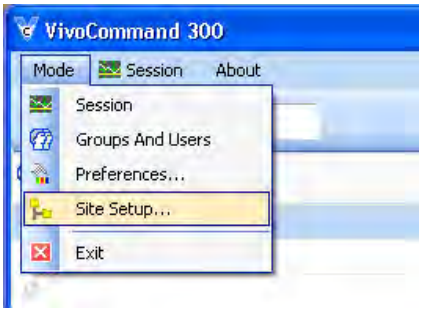
1. See the CD included in the VivoResponder™ kit to download VivoCommand Software. If you misplaced or did not receive your CD please call customer service.

2. When VivoCommand installation is completed, an icon is placed on the Desktop. Double click on it. The program takes a moment to load.

3. The ***Main Session*** screen will open and looks like the picture below.



4. Click on **<Mode>**, then on **<Site Setup>**.

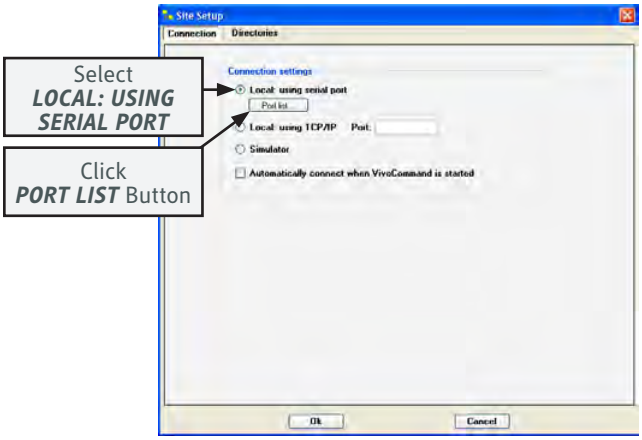


5. The ***Site Setup*** pop-up window will open. The ***Connection*** tab will be displayed. Follow procedure for wither USB Base Station(s) or Ethernet Base Station(s).

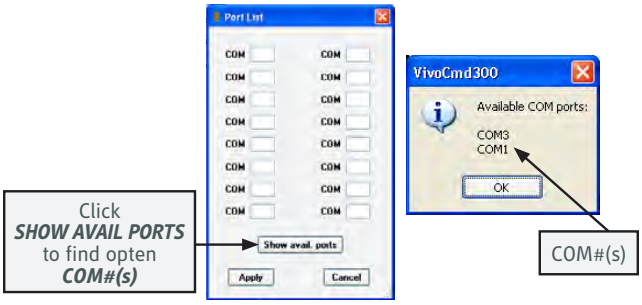
USB Base Station(s)

A. Plug in USB Base Station

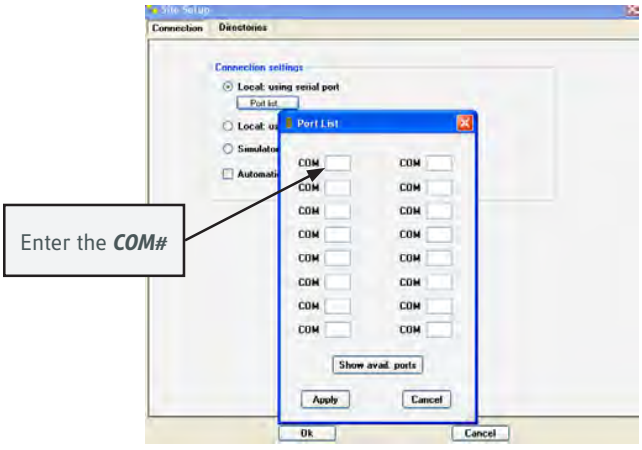
B. The ***Connection*** tab will be displayed. Select ***Local: using serial port***. Click the **<Port List>** button.



C. A window will open as shown below. Click **<Show avail ports>** which will open a pop-up. Jot down the COM#(s) then click **<OK>**.



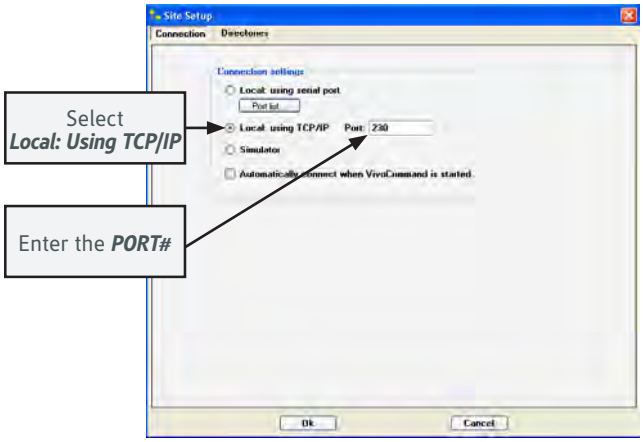
D. Type the ***COM#*** into the open field. Multiple USB Base Station users enter each of the ***COM*** numbers into the open fields.



E. Click **<Apply>**, then **<OK>** to save the Port List.

Ethernet Base Station(s)

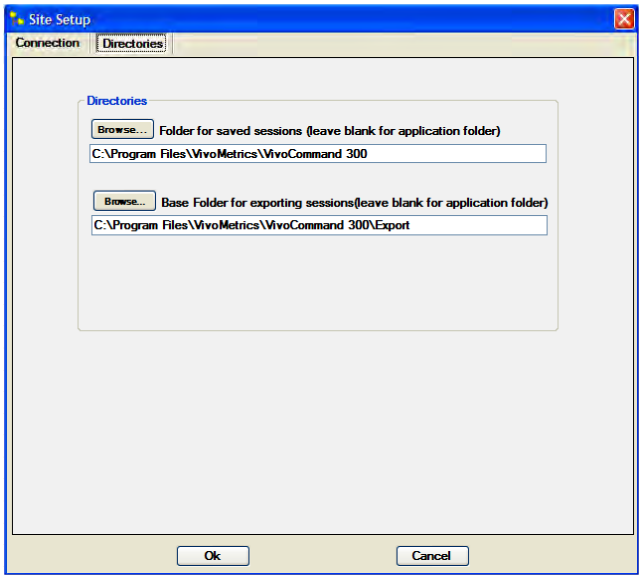
A. With Ethernet Base Station, click ***Local: using TCP/IP*** and type the TCP/IP port into the field next to Port: It is recommended to contact I.T. support.



B. The Simulator button may be selected to run a VivoCommand simulation, which is described in *Testing the Set-up*.

C. ***Automatically connect when VivoCommand is started*** can be checked if desired.

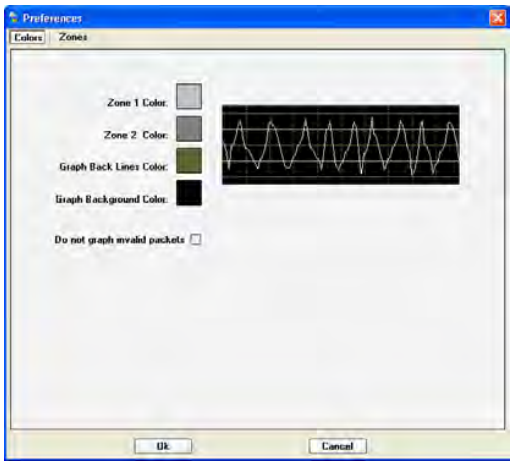
D. In the Site Setup window, click on the second tab – **<Directories>** – and browse to the desired folder to store saved sessions and for the exported data. Leave the field blank to store data in the Application Folder. The C:\Program files\VivoMetrics\VivoCommand folder is the default.



Setting Preferences

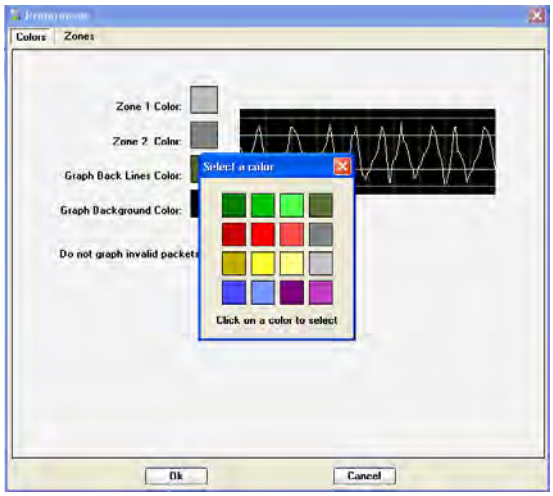
1. Click on **<Mode>** on the ***Main Session*** screen and then

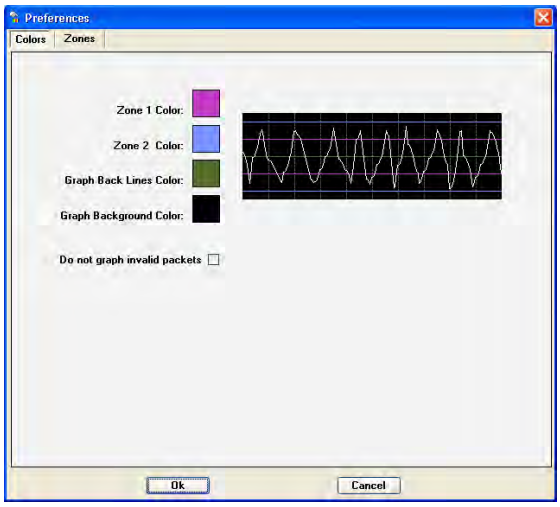
choose ***Preferences.***



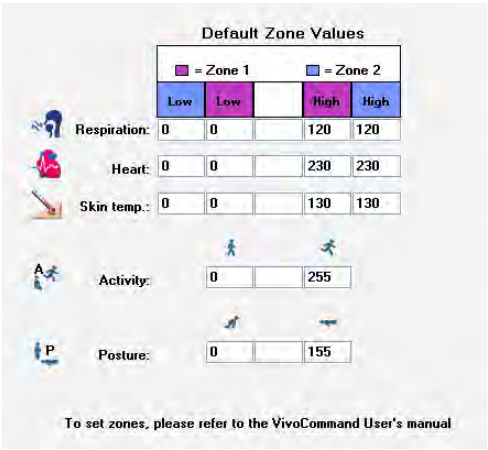
2. Click on the ***Colors*** tab. The default Zone colors are light and dark gray.

3. To change the Zone colors, click on the gray square and a pop-up will appear. Choose desired Zone colors. ***Graph Back Lines*** and the ***Graph Background Color*** can also be customized.





4. In this manual, the colors purple and light blue have been chosen as the default Zone colors. Click **<OK>**.



5. Click on the ***Zones*** tab in the pop-up window. The maximum and minimum values for each of the five parameters—*Respiration, Heart Rate, Skin Temperature, Activity and Posture*—are the preset ***Default Zone Values***.

To set Zone Values based on an individual's physiologic profile, it is recommended that the following references be consulted:

http://www.acsm.org/Content/NavigationMenu/News/Other-media/BooksCDs/Books_and_Multimedi.htm

ACSM's Guidelines for Exercise Testing and Prescription, Seventh Edition

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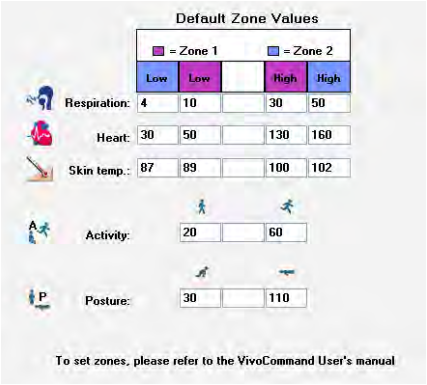
Maryland Fire and Rescue Institute and Center for Firefighter Safety Research and Development report, "Health and Safety Guidelines for Firefighter Safety"

http://www.mfri.org/fireresearch/hsg/healthandsafetyguidelines.pdf

See table on page 63 of the report (page 64 of the PDF)

NOTE: The ***Zone Values*** input into these fields will automatically be inserted when a new user is added. A user's parameter cell



will change color if a defined Zone Value is reached. Zones are described in detail in this manual.

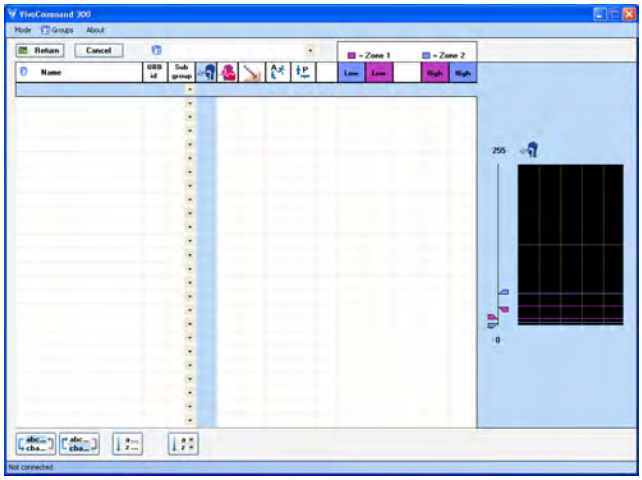
6. In this manual, the following Zone Values have been set and are used as an example of how to set Defaults and Zone Values. Click **<OK>**. Default colors and Zone Values are now set.

Creating Groups and Users

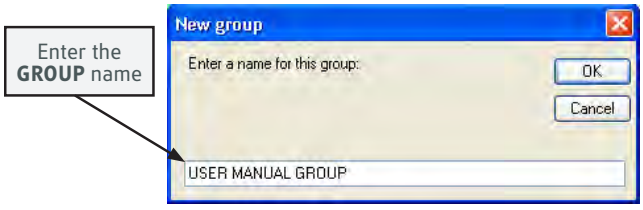
This section describes how to prepare and customize VivoCommand Software.

1. Click on **<Mode>** on the ***Main Session*** screen and then choose ***Groups and Users***.

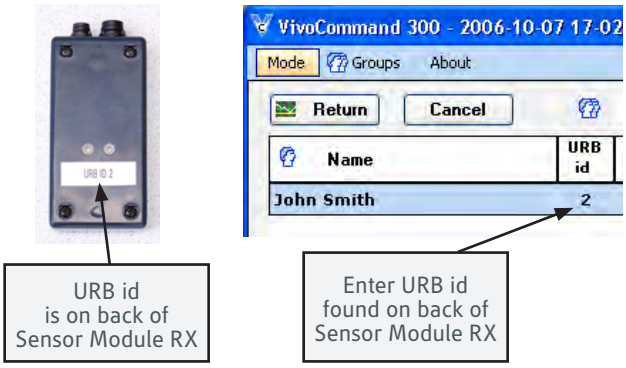
2. You are now on the ***Groups and Users*** screen as shown below:



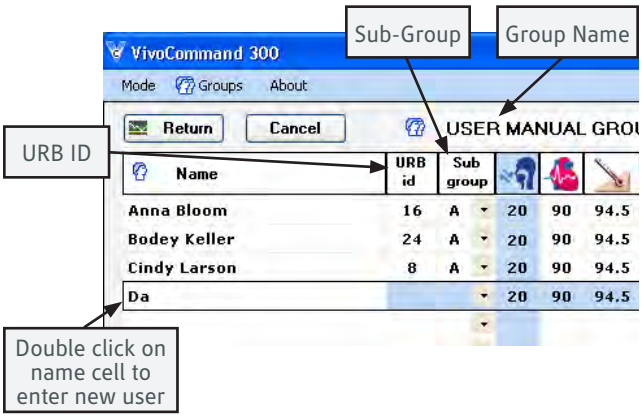
3. Choose **<Groups>** and then ***New Group***. A pop-up window appears with a field to enter the name of the group. Enter the ***Group*** name in the ***New Group*** popup window, and then click **<OK>**.



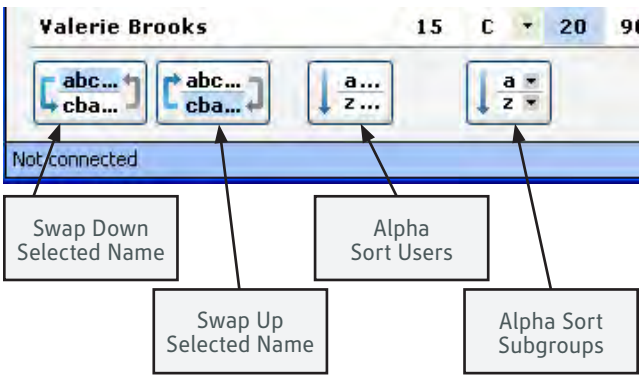
4. Once the Group is named, enter the names of each team member in the cells in the ***Name*** column. Double click each name field to enter a name. Also enter the ***URB id*** – the preprogrammed unique identifier printed on the outside of each Sensor Module that the named user is wearing. Up to 25 people can be entered, then further grouped by alphabetically defined ***Subgroup***.



NOTE: As each name is entered, the Zone Values that were set in previous Preferences section appear. Customizing zones for individual users is described in the next session: Zones.



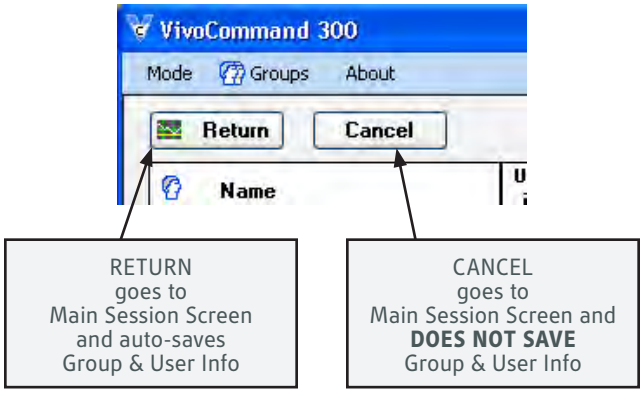
5. Users can be sorted by Subgroup and/or listed alphabetically using the buttons at the bottom of the Groups and Users screen.



6. There are two ways to save your entries once each Group member's name, URB id, and subgroup are entered and/or when you have made changes to an existing Group. All saved files will be located in folder chosen under Site Setup/Directories.

   A. Click on **<Groups>**, then **<Save Changes>**.

   B. Click the **<Return>** button to bring you back to the ***Main Session*** screen. File is automatically saved when you click.



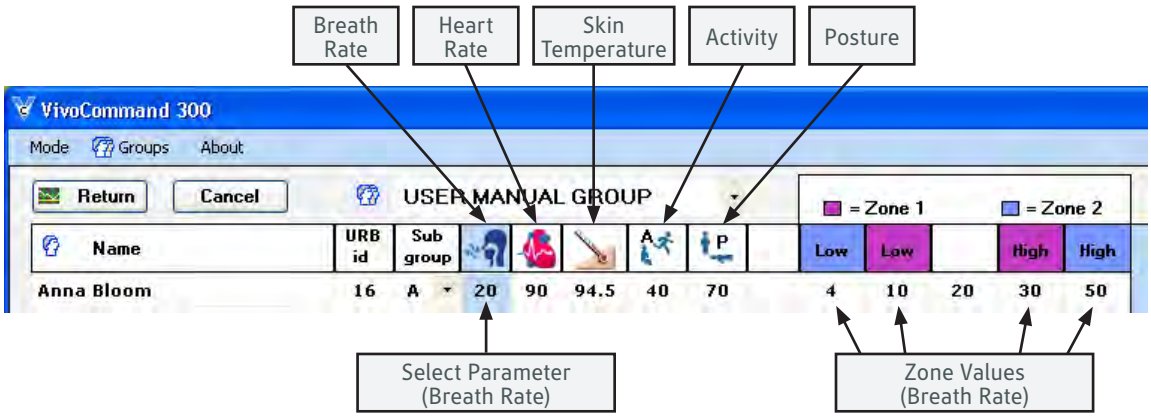
NOTE**: When you click the Cancel button, you will return to the Main Session screen.* ***Data will not be saved.

***NOTE**: VivoCommand is designed for an infinite number of saved Groups. Only one Group can be active at a time.*

Zones

VivoCommand Software monitors five parameters: ***Breath Rate, Heart Rate, Skin Temperature, Activity, and Posture***.

1. ***Breath Rate, Heart Rate,*** and ***Skin Temperature*** have four customizable zone values as shown below: Zone 1 Low and High (purple) and Zone 2 Low and High (blue). The center column is the average between Zone 1 high and low levels. All are customizable for each user.



2. ***Activity*** has two Zone Values; both are customizable for each user.

3. ***Posture*** has two Zone Values: standing upright and laying down.

Customizing Zones

1. Customized Zones can be set two ways:

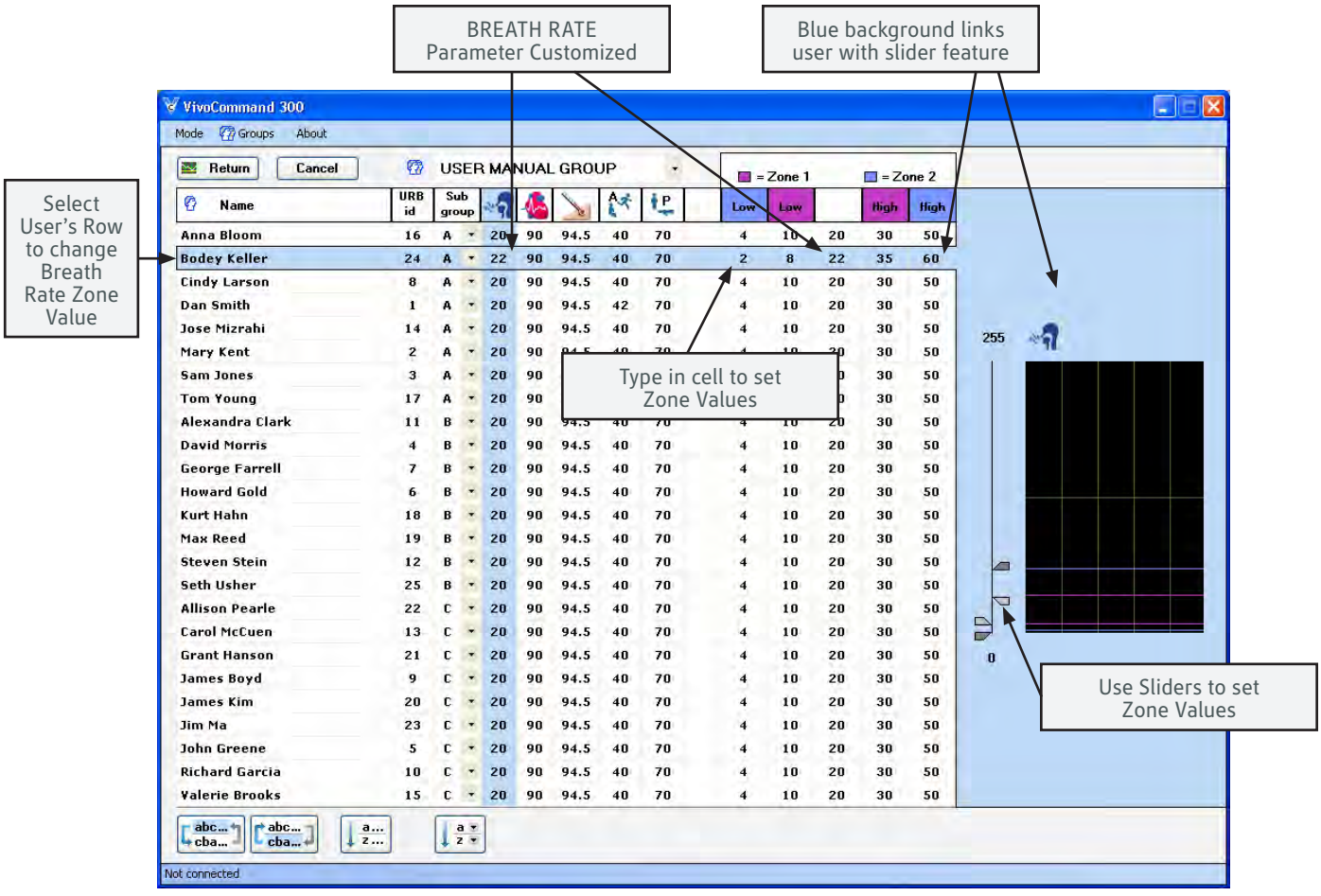
   A. Enter a Number in the Cell:

   Create a "crosshair" by clicking on a user's row and one of the parameter columns. Double click in one of the cells on the right side of the screen; type in the desired number. Repeat.

   B. Use the Sliders:

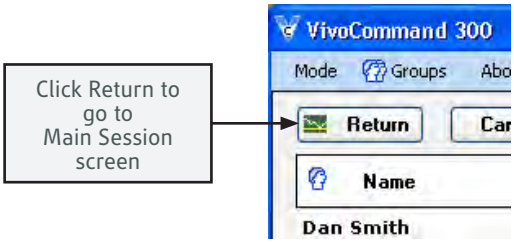
   Create a "crosshair" by clicking on a user's row and one of the parameter columns. Drag each of the four sliders located on the right side of the screen to set Zone Value. Sliders correspond to zone columns and show graphically what the trend screen will look like. When a parameter goes above or below the purple or blue line the cell in the Main Session screen will change to purple or blue respectively.

The screen below shows an example of the ***Breath Rate*** Zone Value customized for an individual user.



2. To restore all users to the ***Zone Values*** created in ***Preferences***, go to ***Groups*** and click on **<Set Default Zone Values To All Members>**. All users will be restored to those values.

3. When all zones have been customized, click on the **<Return>** button to go to the VivoCommand ***Main Session*** screen. Changes are automatically saved.



NOTE: You can also save by click on Groups, then Save Changes. The Cancel button will also take you to the Main Session screen, but changes are not saved.

Testing the Setup

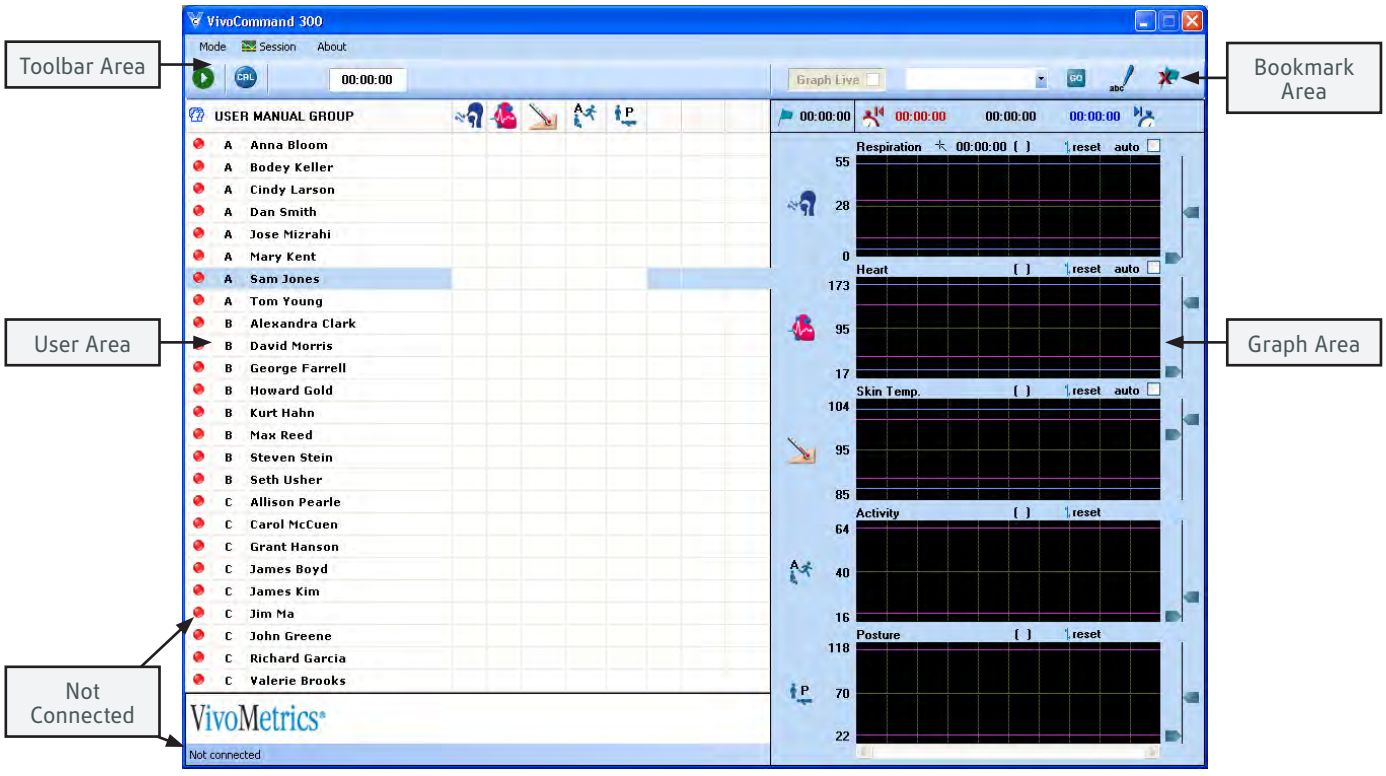
1. There are two ways to test the setup of VivoCommand Software. Both use ***Session Mode***, which is used to run live sessions once setup is complete:

   A. Have 1 to 25 people put on the VivoResponder™ System.

   B. Use the VivoCommand Simulator in Site Setup.

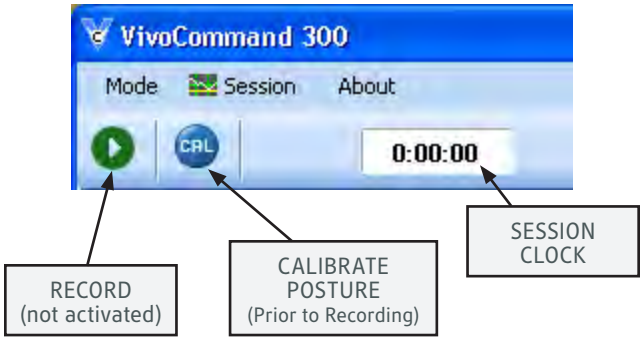
2. After names have been entered, parameters set, subgroups created, and all have been saved in ***Groups and Users*** mode, click the **<Return>** button, which goes to the ***Session*** screen.

3. The four main areas in Session mode: toolbar, bookmark, user, and graph are indicated below. When the system is not connected, the "LED" dots next to each name are red. Not connected is also indicted in the lower left corner of the screen.

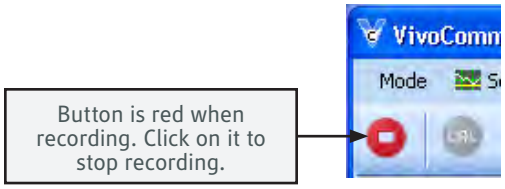


Toolbar Area

The ***Toolbar*** area starts and stops recording, checks posture calibration prior to recording, and tracks the running time of a session.



1. The ***Green Record*** button is used to begin recording a session. The button is green when ready to record. The button is red when recording. Click on the **<red button>** to stop the session.



2. The session is automatically saved within the Group folder once every (1) second. The files are saved using the following convention:

   …\group_name\yyyy-mm-dd hh-mm-ss\…

3. A ***session*** is made of three files within the folder:

   » The yyyy-mm-dd hh-mm-ss.urb file contains the physio-data and is the tile that can be loaded to view the session post event.

   » The groupsnapshot.ini file contains the group when the recording was made.

   » The bookmarks.bmk file contains all Bookmark information

4. The program cannot be closed while recording.

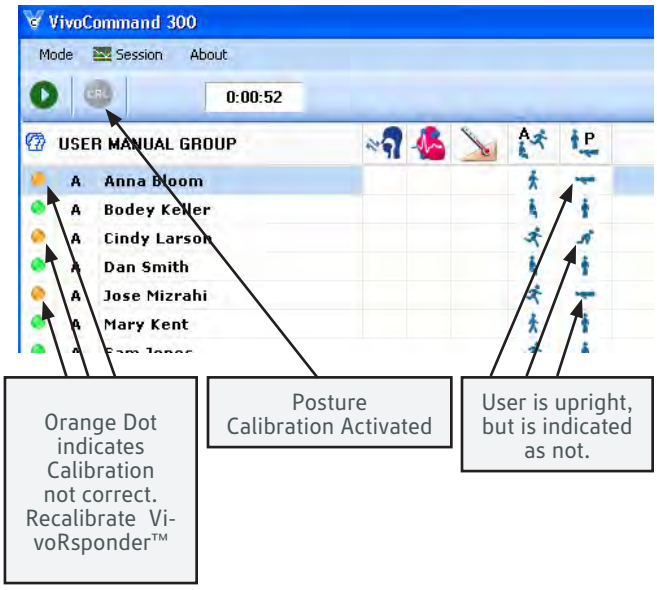
5. While recording, the ***Clock*** will track the session length.

6. ***Optional***: Use the ***CAL*** button to check if a user's VivoResponder™ posture has been calibrated correctly it will display posture of all connected users without recording any data.

   » Before connecting to run a live session, all users should be instructed to stand-up straight.

   » Click on the **<CAL>** button. As shown below, if a user was not properly calibrated, the "LED" to the left of the name turns orange and the posture icon indicates the user is not standing upright.

   » If the user is standing upright but the posture parameter indicates otherwise, the VivoResponder™ should be powered off and on to recalibrate while the user is upright.



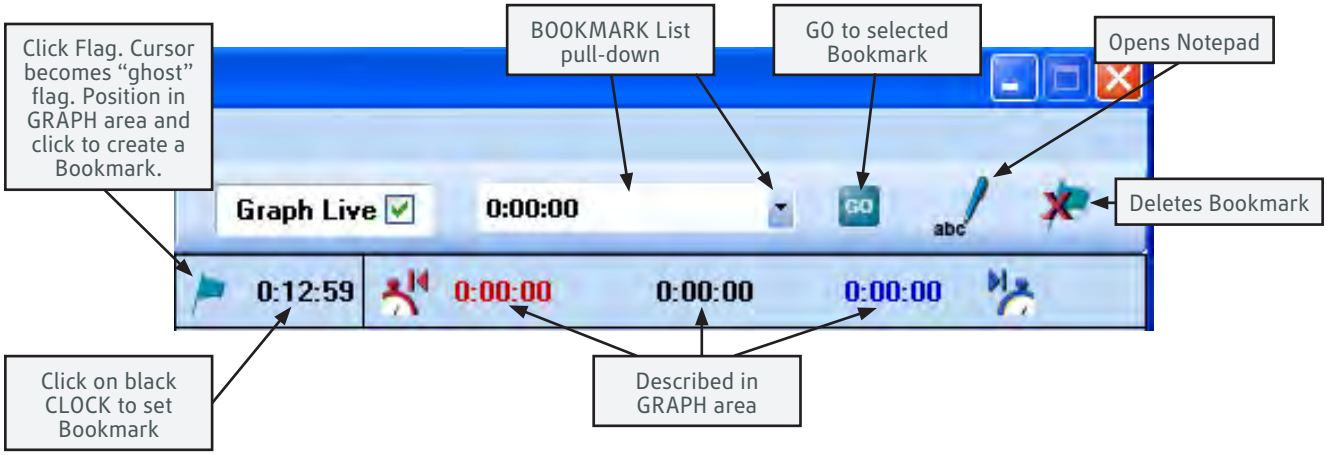
Bookmark Area

The ***Bookmark*** features can be used during a live session and on a recorded session.

1. There are two ways to create a ***Bookmark***.

   A. Click and release on the **<blue flag>** icon. The cursor will become a "ghost" outline of the flag. Move it to the Graph area desired and click to create a ***Bookmark***. The time of your ***Bookmark*** appears in the pull-down ***Bookmark*** list in the center of the ***Bookmark*** area. This is a good way to mark something unusual in the data.

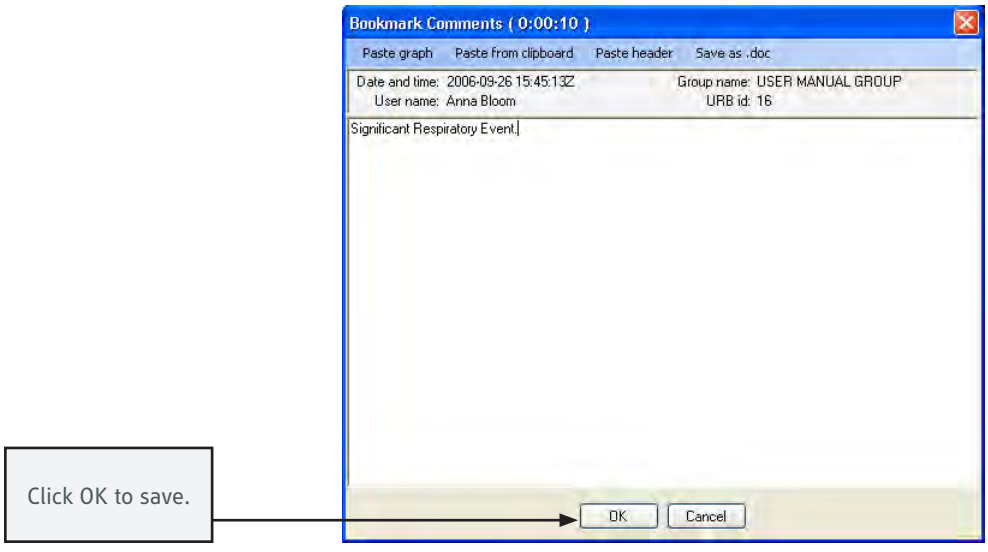
   B. Click on the **<time field>** next to the blue flag. At the time of the click a ***Bookmark*** will appears in the ***Bookmark*** list in the center of the ***Bookmark*** area. This is useful to synchronize with the start of an event.



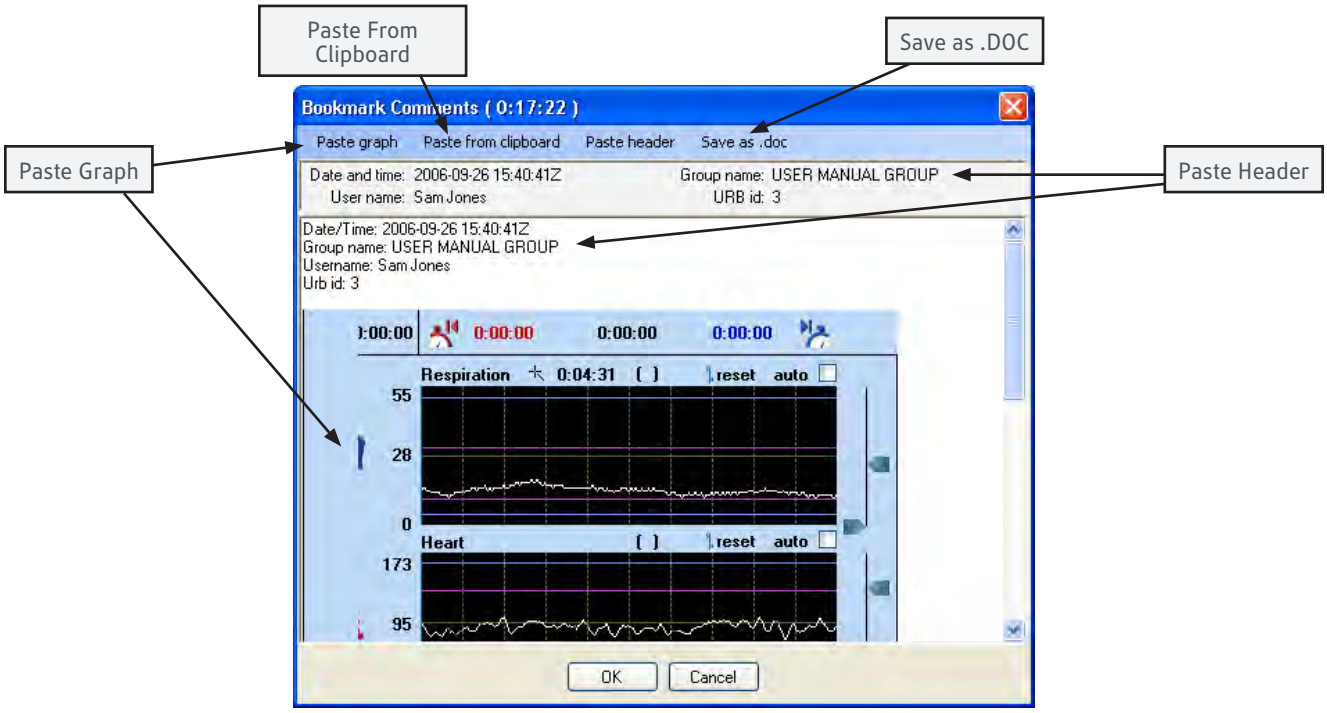
2. A ***Bookmark*** is automatically created at time 0:00:00 for every session. This bookmark cannot be deleted. It is intended to be a place to enter session information and notes.

3. The ***ABC button*** opens a pop-up window with a Notepad that corresponds to a particular ***Bookmark*** from the pull-down list.

   A. Text can be added by clicking in the window and typing during live recording and can be added later into a saved sessions. Click **<OK>** to save.

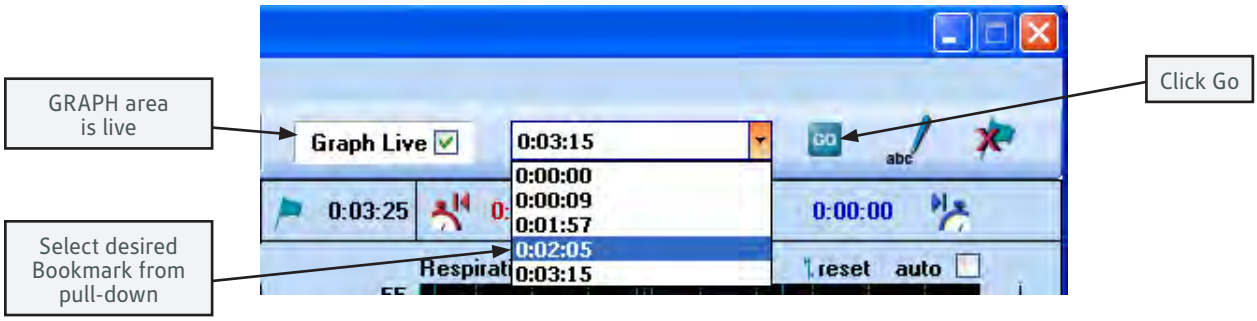


B. The graph, the header, as well as an item from a clipboard can also be pasted into the Notepad. It can also be exported as a Microsoft Word .doc.



4. Use the ***Bookmark*** pull-down to search to time in the recorded Graph.

A. When recording, select the desired Bookmark, then click **<GO>**.



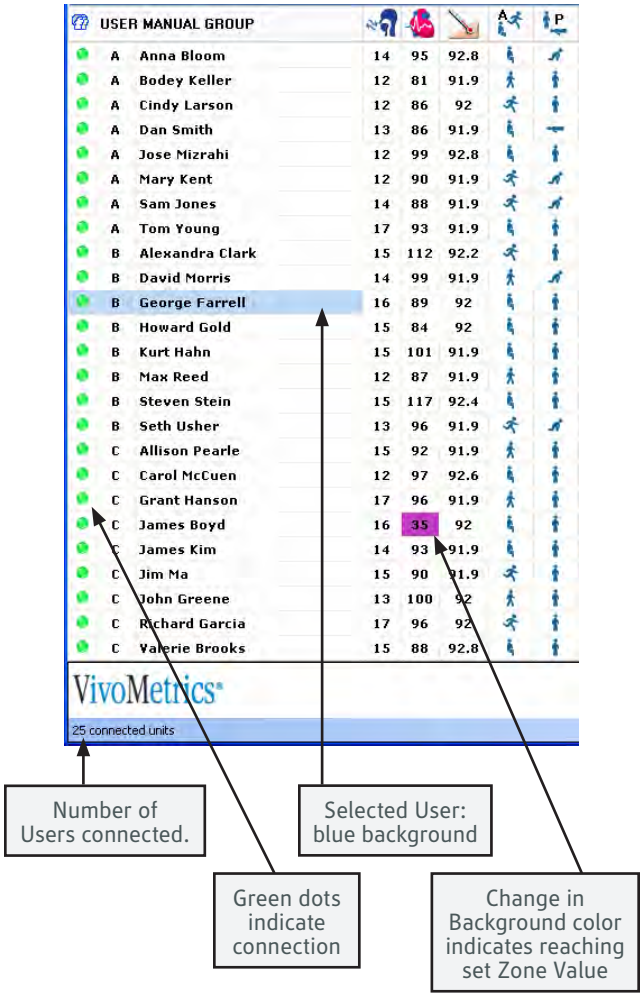
B. The Graph area is will go offline, but the session will continue to be recorded.

5. When mouse is moved in the graph, the value of the Parameter and the time of that event are shown next to each Parameter.

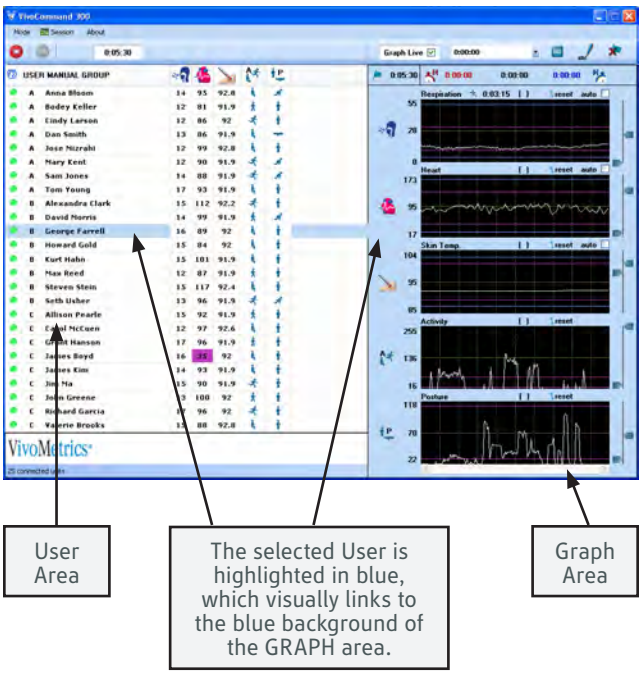
6. The flag with the X button deletes the selected Bookmark.

User Area

The ***User Area*** shows the value for each of the five parameters based on ***Zone Values*** set in ***Groups and Users***.



1. ***Breath Rate, Heart Rate***, and ***Skin Temperature*** are numerical; ***Activity*** and ***Posture*** are icons.
2. Vital sign data are updated every second.
3. The background colors of the cells reflect the Zone Values set for the user. If the background is white, then the value is within mean/normal.
4. If the user is connected and no data is being received, the dot next to the name will turn yellow. If there is no data after 10 seconds, the dot will turn red.
5. To display a specific user's trend graphs select a user by clicking on the name cell or use the up/down arrows on your keyboard. This changes the corresponding graphs on the right side of the screen to the corresponding show real-time data of the selected user.

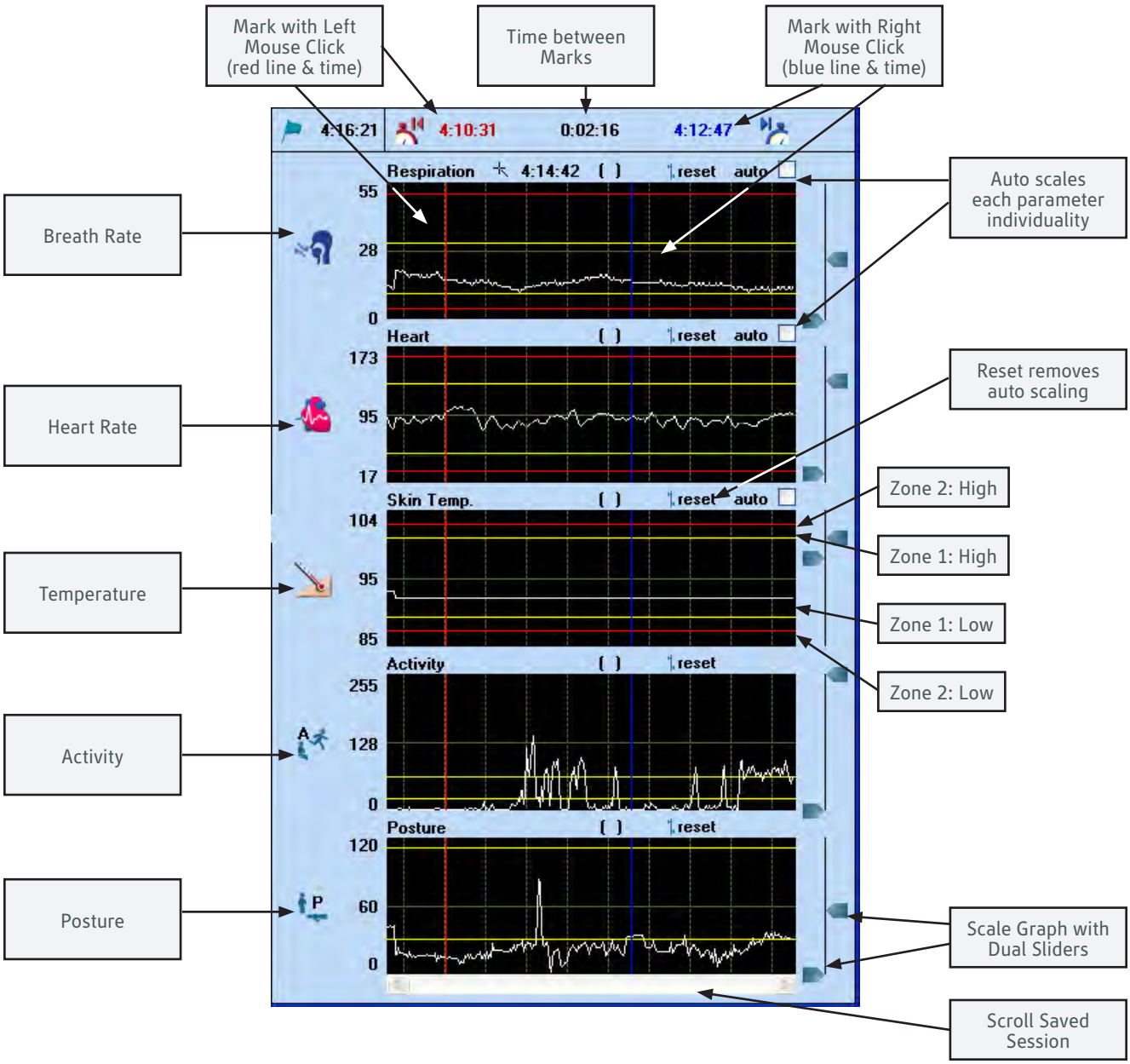


6. The highlighted user links to the ***Graph Area***.

Graph Area

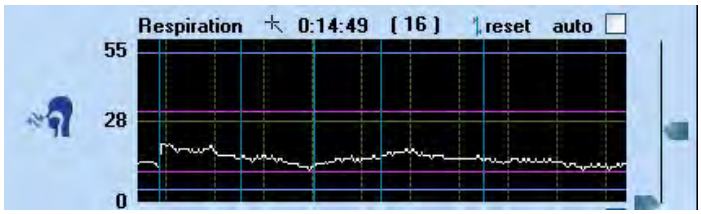
The ***Graph Area*** shows the trend data of the last five minutes of the five physiological parameters in a graphical manner for an individual user.

1. Graphs are updated once every second.
2. Preset color horizontal lines represent the ***Zone Values*** as set in Groups and Users. A user's zones can be modified while recording, but not when playing back a session.
3. To scroll through previous sensor data, uncheck the Graph Live button at the top of the ***Bookmark*** area. The Graph Live checkbox is disabled in playback mode. The session will continue to record. No data will be lost.
4. The top of the Graph area is used for Markers. Place mouse over location on graph to set a Marker and click the left and/or right mouse button to set. The left marker is shown as a vertical red line and the right marker by a blue line in the graph area. The time of each marker is displayed and the duration between the markers is automatically calculated.



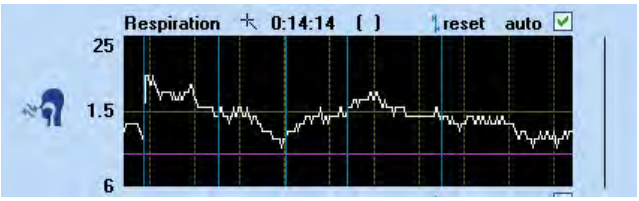
5. Any chart can be scaled using different values than the default ones by moving the arrows of the dual sliders.

   » Values displayed with default scaling values:



6. If ***Auto*** is checked for each parameter, the scaling is set so that the values will fit inside the ***Graph Area*** to the maximum size possible and the Sliders will disappear.

   » Same values with auto scaling:



   » Click on reset to set the scaling back to the default scaling values.

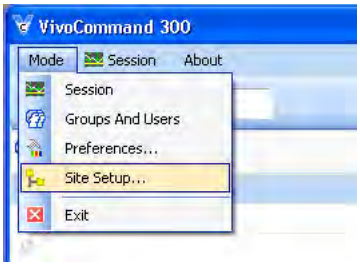
7. To review a saved session, use the Scroll Bar at the bottom of the Graph area.

***NOTE**: If a user goes out of radio range, the graph will be drawn with a gray line repeating the last known good value and the dot will turn red.*

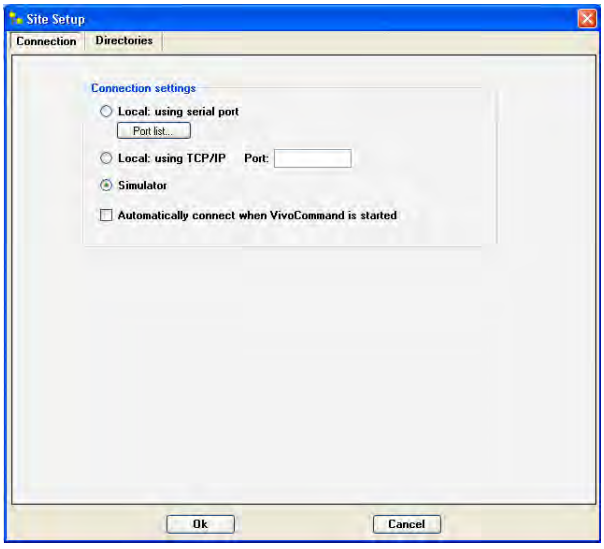
Simulator Mode: Follow this Section as a Tutorial

Simulator mode is used to familiarize you with VivoCommand Software.

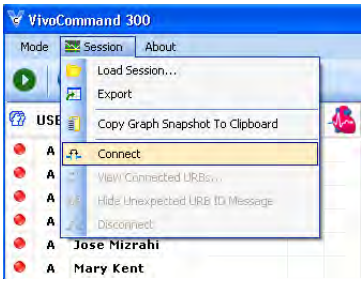
1. To activate the ***Simulator***, click on **<Mode>**, then **<Site Setup>**



2. In the pop-up window, click **<Simulator>**, then **<OK>**.



3. To run the ***Simulator***, go to ***Session*** and click on **<Connect>**.



4. Click on the **<green arrow>** button. It will change to red. You should see simulated data starting to display in the Graph area.

***NOTE**: If you have fewer than 25 users entered, you will see an error message unknown URB's… This is because the Simulator sends 25 sets of data. If you have 20 users in the field, but only input 19 names, this would warn you that the set-up is incomplete.*

Test Your Understanding of How to Collect Data:

- » Set a Bookmark
- » Add a text note to the Bookmark
- » Go in and out of live mode
- » Scale the graphs
- » Reset a zone while live
- » Change the graph colors
- » Try every button
- » Stop the session
- » Disconnect

In the next section, you will learn how to export data.

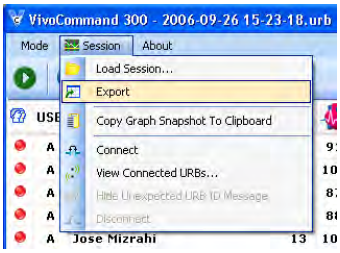
Exporting

Live sessions or saved sessions can be exported in a few simple steps.

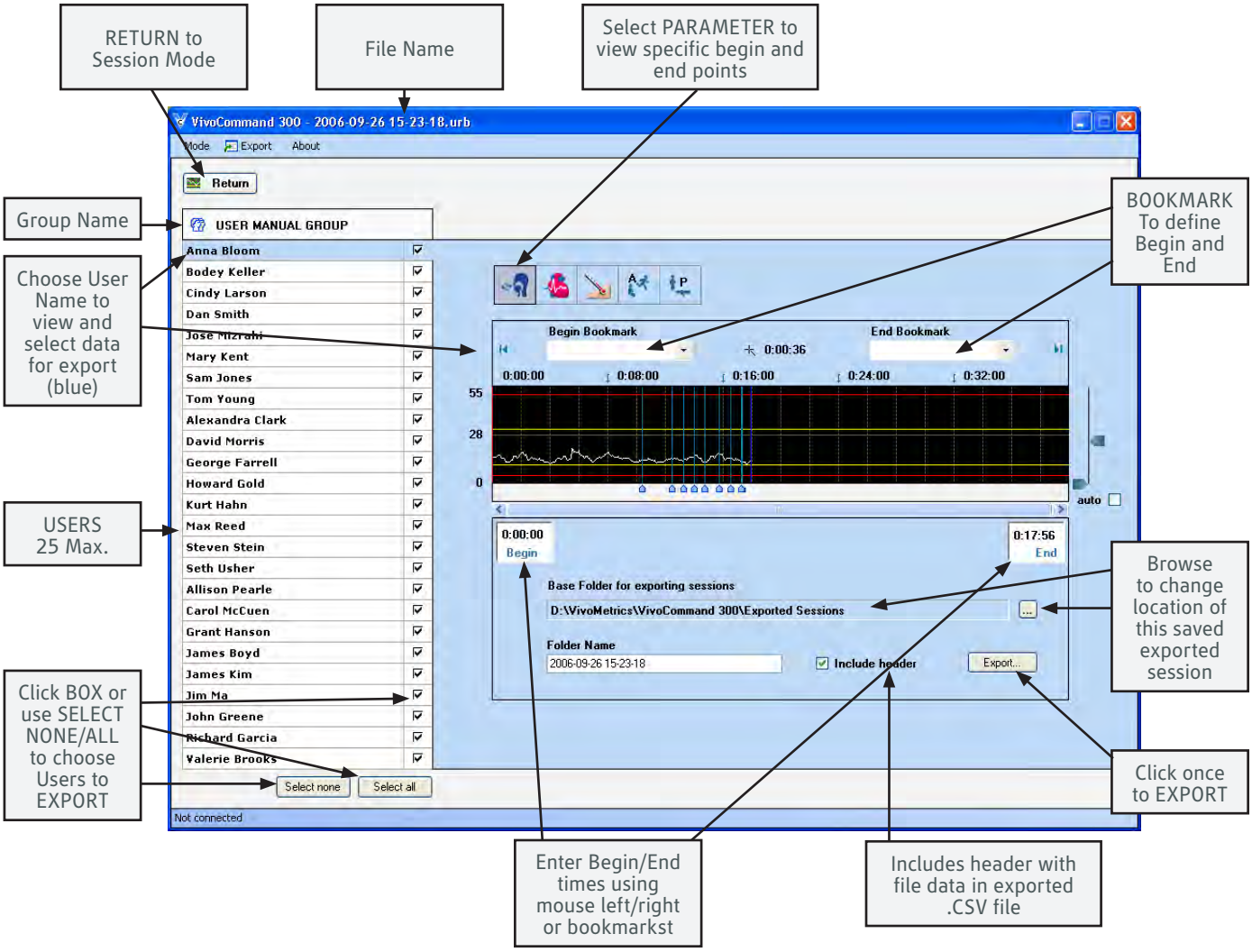
» If the session is live, click **<Stop>**.

» If the session is saved, go to ***Session***, then ***Load Session***, which will launch a pop-up window to browse to where files are located. Click on the desired **<.URB file>** (created by live recording) or **<.RAW file>** (created using the Data Logger – see the Data Logger Manual) to load.

» Go to ***Session***, then click **<Export>**.



The ***Export*** screen will look like this:



Exporting

1. All or any users can be selected for export. By default, the files will contain all the recorded data.

2. ***Begin/End*** is the same for ***ALL*** users and can be modified in one of three ways:

   » Use the mouse left/right buttons

   » Select begin/end Bookmarks from the left/right list boxes

   » Click on the **<left/right>** arrows.

3. Export mode creates ***COMMA DELIMITED (.csv)*** files that can easily be imported into MatLab or any statistical analysis program or database.

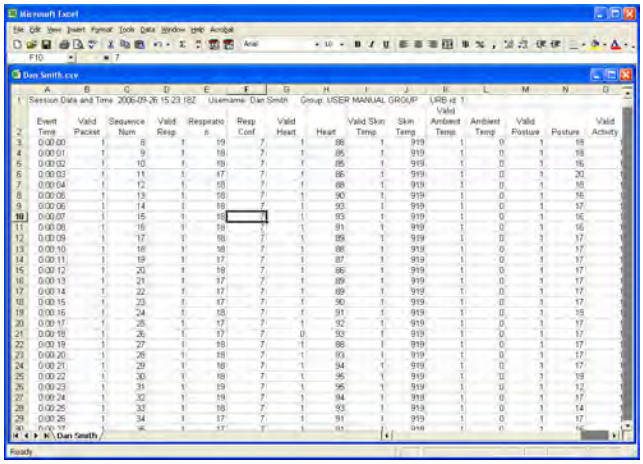
4. The folder name is the date/time stamp of the session. All .csv files will be created under that folder. All files will be named ***user_name.csv***.

5. In the example above, six users were exported and the following files were created:

   …\2006-09-26 15-23-18\Bodey Keller.csv
   …\2006-09-26 15-23-18\Dan Smith.csv
   …\2006-09-26 15-23-18\Jose Mizrahi.csv
   …\2006-09-26 15-23-18\Max Reed.csv
   …\2006-09-26 15-23-18\Sam Jones.csv
   …\2006-09-26 15-23-18\Tom Young.csv

***NOTE**: The folder's default location is set in Mode/Site Setup/ Directories or can be changed for one specific export on the Export screen.*

6. Click on one of the .csv files and it will launch Microsoft Excel.



Export .CSV—Column Headers

The chart below describes the columns in the .CSV export.

Col A	Time	In seconds from start of recording to end
Col B	Valid Packet	Either 0 = invalid or 1 = valid
Col C	Sequence	1-255
Col D	Valid Respiration	Either 0 = invalid or 1 = valid *
Col E	Respiration average	Breath rate per minute
Col F	Respiration Confidence	1-7 confidence value that respiration is accurate (7 being 100% confident)
Col G	Valid Heart Rate	Either 0 = invalid or 1 = valid **
Col H	Heat Rate Average	Heart rate per minute
Col I	Valid Skin Temp	Either 0 = invalid or 1 = valid
Col J	Skin Temp	Temperature under the armpit in Fahrenheit without the decimal point
Col K	Valid Ambient Temp	Either 0 = invalid or 1 = valid
Col L	Ambient Temp	Temperature on the PCB inside the sensor module in Centigrade without the decimal point
Col M	Valid Position	Either 0 = invalid or 1 = valid
Col N	Position	When calibrated (standing upright when starting system during green light flash) then 0 = upright and 250= upside down
Col O	Valid Activity	Either 0 = invalid or 1 = valid
Col P	Activity	0 = stationary, 255= maximum activity

*As the sensor module monitors the RIP band's hardware, a "band OK" bit reflects the condition of a correct electrical band connection and reasonable observed frequency range of the associated RIP oscillator. To reduce false cycles, the RIP value trend is monitored and considers changes when the RIP value slope value exceeds a pre determined 1st derivative level.

**A HR "OK bit" indicates pulses are being received from the Polar Wearlink transmitter in the proper sequence, and that motion artifacts are within the system recovery specs. This implies that the Polar Wearlink snaps are properly connected, the fabric ECG patches are conducting, and the sensor circuit is functional. The "OK" bit state is reflective of these conditions:

1) HR values are tracking "smoothly"[1] and 8 or more valid beats have been observed.
2) Motion artifact caused beats that are out of specs have not exceeded 32 consecutive beats to false plateau {2}
3) No single beat longer than 4 seconds is observed (considered same as disconnected hardware)

[1] HR "smoothness" rule dictates that no instantaneous beat rate can differ from the present average by more than 24BPM

[2] Sharp Transitions of HR are permitted if the new "non smooth" incoming beats belong to a new baseline in which smoothness rule is observed. This permits tracking of fast HR changes as might be observed in a resting person standing up and jogging. The new HR plateau should be seen in 32 beats to avoid being classified as motion artifact

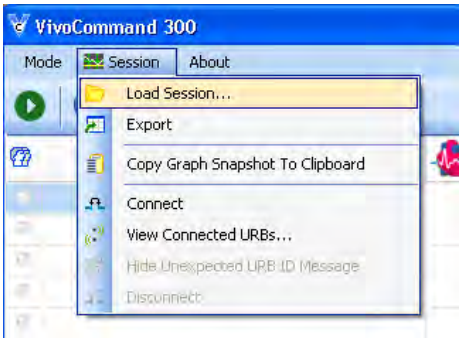
Loading a Saved File

Loading a Saved .URB or Data Logger File

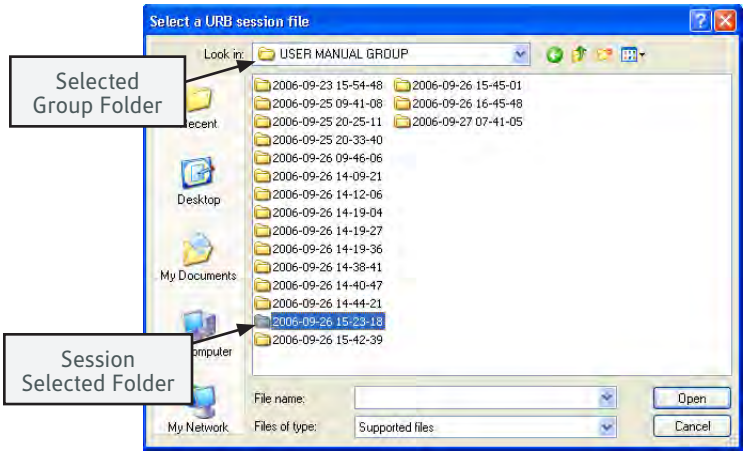
You can load a previously recorded files (.URB) or a data logger file (.RAW) for review in VivoCommand and to export as a .CSV file.

Load a Saved .URB File

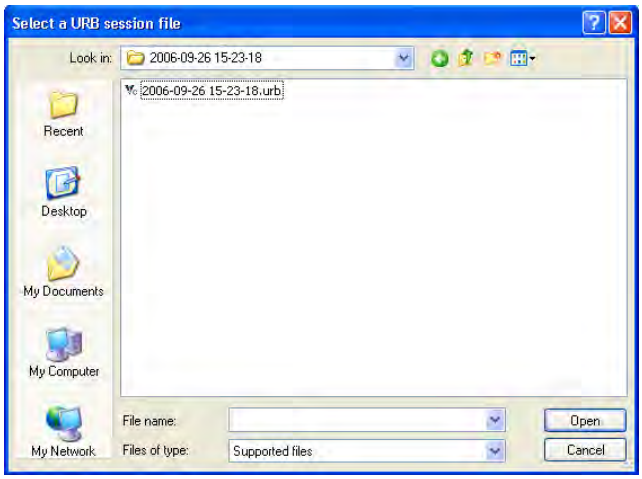
1. To load a .URB file, go to ***Session*** and click on **<Load Session>**



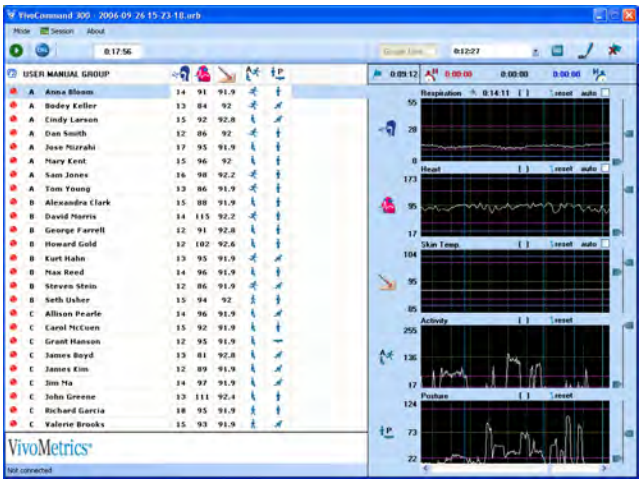
2. A pop-up window will appear with the folder that was previously chosen to save files. Click on the ***folder of the named Group*** you wish to load, then select the ***Session*** to load.



3. The .URB Session file appears as below.



4. Click on it and it will load this previously recorded Session in VivoCommand.

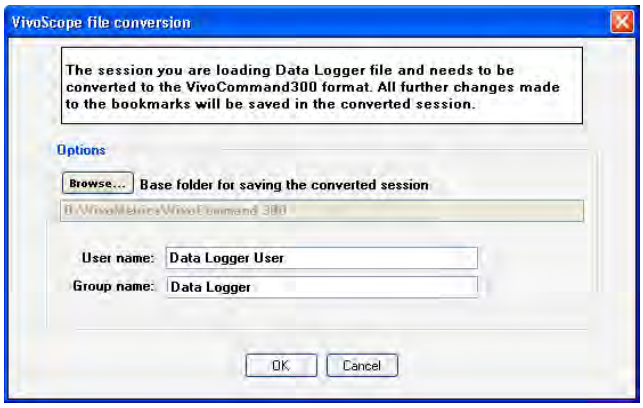


Loading a Saved File

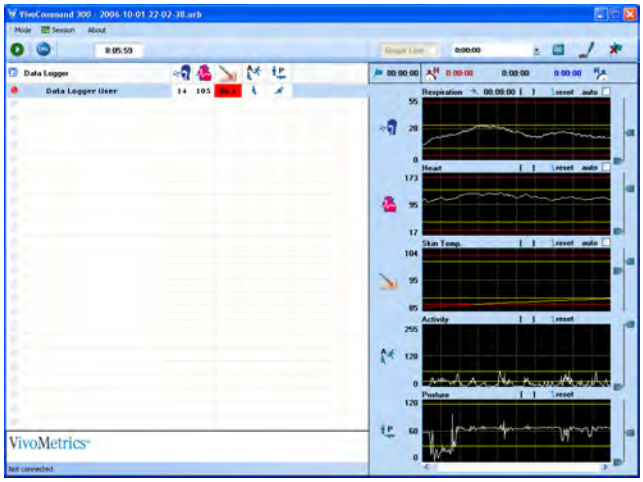
Load a Data Logger .RAW File

1. Go to ***Session***, then ***Load Session*** (same as shown above for .URB files)

2. A pop-up window with your .RAW files will open. Click on the user you want to load and the ***File Conversion*** window will open.



3. Click **<OK>** and File Conversion will automatically change the .RAW to a .URB file, save to where you direct it, and launch the file in VivoCommand.



NOTE: Data Logger files can only be viewed one user at a time.

Troubleshooting / FAQ's

What are the computer requirements to run VivoCommand?

PC with minimum requirements of:
- » Pentium 4, 1.5 GHz processor
- » 512 Mgs RAM
- » 60 Gig HD
- » USB/Ethernet ports

What version of VivoCommand am I using?

In the main toolbar, click on About. This will open a pop-up window with information about the installed VivoCommand. Authorized customers can download new versions.

I know that I am using a USB port, but when I entered the COM number, the system did not work.

You do not have the correct serial port number. Go to the Base Station tab and follow instructions regarding locating the serial port(s) number(s).

I used the CAL function to check the posture calibration of my users and noticed that the icon shows one of them as lying down, but I can see that the person is standing upright?

If the user is standing upright but the posture parameter indicates otherwise, the VivoResponder™ should be disconnected from the Sensor Module, then plugged back in with Sensor Module in the holster to recalibrate while the user is upright.

What types of files are generated?

- VivoCommand creates .URB files
- The Data Logger creates .RAW files

Service

If VivoCommand requires warranty or non-warranty service, please contact VivoMetrics Customer Support.

If you fax or email Customer Support, be sure to include your name and a contact phone number or email, and a complete description of the problem you encountered, including what you were doing and what is not working properly.

Customer Support:

Telephone:	800-631-4445 (inside U.S.A.)
	805-667-2225 (outside U.S.A.)
Fax:	805-667-6646
Email:	help@vivometrics.com