Physiolab Guide to Convert IBI to Kubios HRV Analysis

Instructions Manual

This manual is for researchers. It focuses on IBI Analysis, and has important appendices on other aspects of research: achieving data files, exporting to Excel and other databases, and how to make your own sequence of tasks for your research project.

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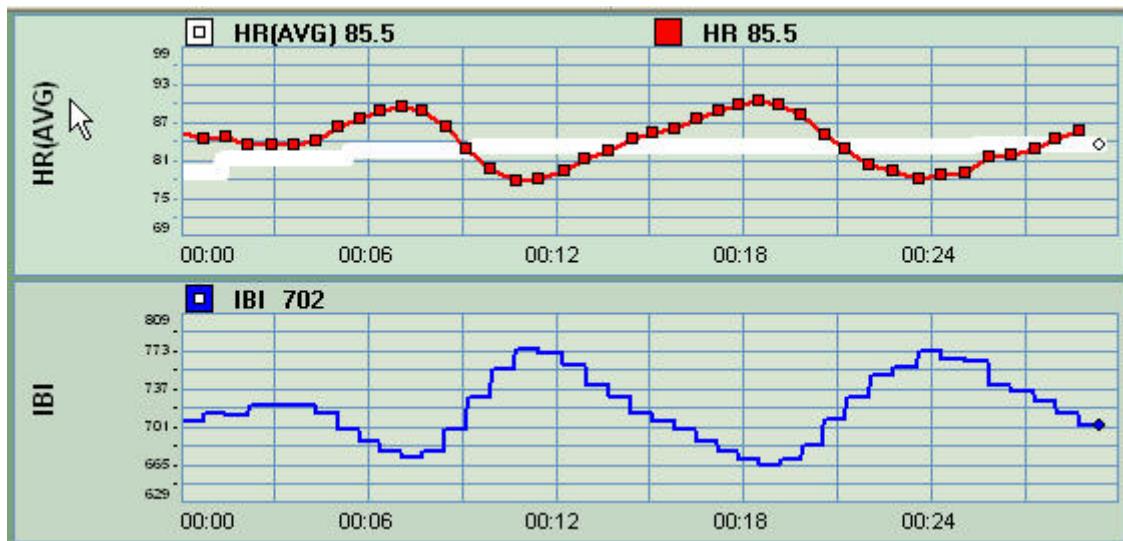
DISCLAIMER:
J&J does not make IBI analysis software. We do however have a new 'ad-on' option that - if checked- allows researchers to use other IBI software to explore sequential IBIs. This mode of IBI data-save was designed for those doing scientific research using the IBI data analysis.

IBI-derived HRV s software is available from Vrije Universiteit AMS. You must obtain their permission to use their IBI-Analysis software. It can be used by researchers for research purposes. It can also be used by clinicians and sports professionals for research. See their website for qualifications.

CONTENTS

Kubios Analysis is a software program that takes raw IBI data and converts it to standardized HRV plots, a standard required for the publication of HRV research.

We are pleased to provide this guide to converting Physiolab data for use in Kubios' HRV analysis software. Kubios has published a new version which is very powerful. If you have the old version, got to their website, register, obtain permission, and download it.

This manual is a generic guide to the general features of Physiolab-inspired software for the physiological signal detection of HRV spectral activity derived from IBI [interbeat interval] data.

Physiolab Applications using IBI have their own manuals.
 Use this basic manual as a general introduction and reference manual as you navigate specific applications.
Visit our information website for updates, revisions, and new information: physiopilot.com

REQUIREMENTS:

C2-Series PHYSIOLOGY HARDWARE ONLY:
You must have one of these units to do Physiolab conversions to Kubios HRV.
These are the only units that run on the Physiolab software platform.
- C2 Plus 6-Channel
- C2 Plus 12 Channel
- C2 GP – RV2 compact unit
- C2 GP – EC compact unit

DOES YOUR SOFTWARE ALLOW YOU TO SAVE IBIs?:

Even having the right hardware is not enough. You must have a software application which records and saves IBI signals properly. Only Physiolab-based software is capable of this. However even Physiolab software must be of the latest type,
We have made several special editions of our HRV series software for a large number of clinics, hospitals and research teams. We estimate that there are at least 50 different versions of our software in various institutions that will run our IBI save routine.

The following Physiolab software we optimized for IBI Kubios Analysis:
1. the C2 Plus Second Generation Bundled Software.
    a. Any application that has ECG in it will also detect and save IBIs for Kubios.
2. The new Physchophysiological Stress Profile [PSP].
    a. It is structured with all the same signals as Research Mode.
    b. If you just want IBIs for Stress Testing, bypass Research Mode and use the PSP.
3. The new BioConnect family/group HRV software.
    a. NOTE: I have not tested the new Kubios with group IBIs.
    b. Test 2 persons and let me know if the data is useable in the new Kubios.
4. The new C2 GP EC compact units.
5. The new C2 GP RV2 compact devices.

a. These compact research-focused devices both detect IBIs. The ECG unit [EC] detects IBIs from the ECG, while the PPG unit detects IBIs from the pulse wave spikes.

NOT SURE? DO THIS TEST WITH THE SOFTWARE YOU ARE USING:
For other software, here are some things to know and a way of testing:
Physiolab applications made before 2008 do not have this feature.
Not all software released after 2008 have this feature.
To find out if your software has this feature, just run it. Press the RUN button, and collect a minute of heart rate data. Then go to the Save Data screen, Save to Database, then Export. From the Export Screen, Select HR/IBI, add a directory folder to receive the IBI data, and press save.
Use a file manager like Windows explore and see if you get a new file in the selected directory, with and .asc extension. If you do, open it in Excel. You will see a single row of numbers, each number an inter-beat interval in milliseconds.

Selecting Physiolab Software for IBI Analysis

Configuring the Software

Set Up the Software to Detect Your Hardware Model

You will need to follow the instructions below after your initial installation and **after each software upgrade**.

- Click on one of the Physiolab desktop icons to get to the opening window.

- Click **Run Session** to bring up the Select Application window.
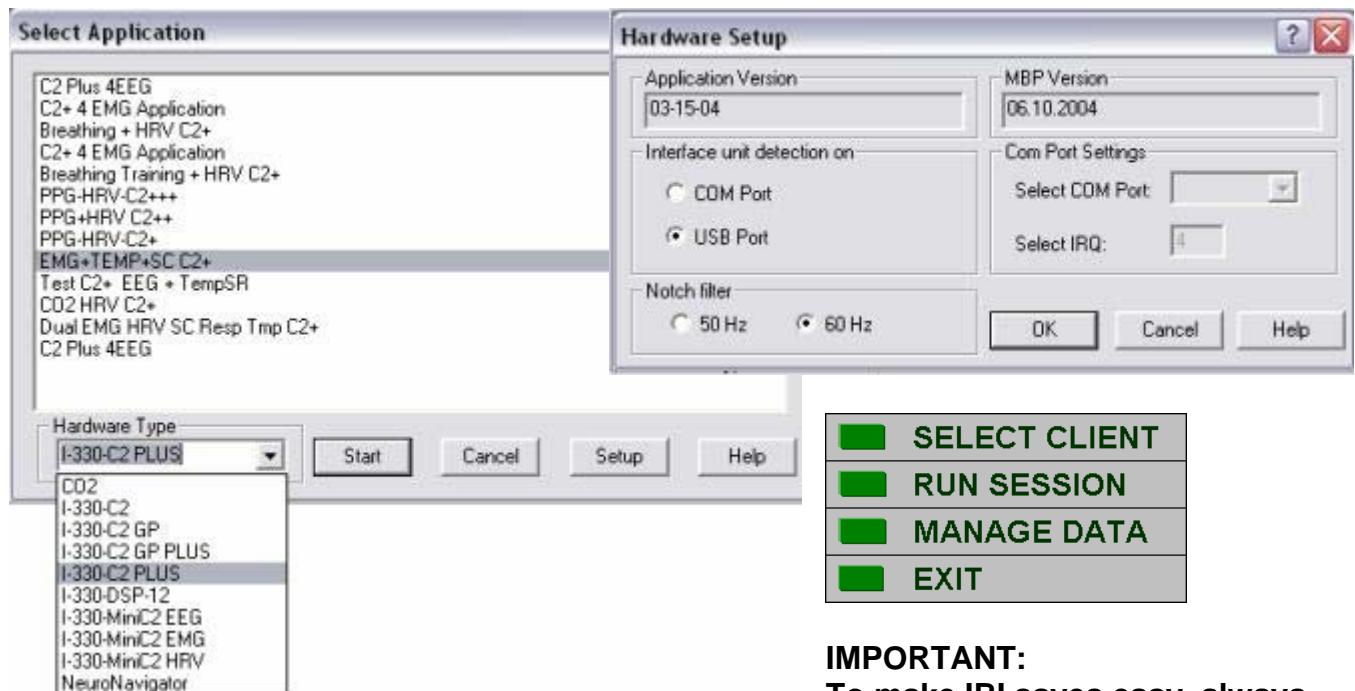
IMPORTANT:
To make IBI saves easy, always select a client first. Then, when you go to save as IBI, the clent name – or research ID name- will automatically be set up.

SELECT CLIENT

To begin running an application click on the **icon** from your desktop. The program will load to the Main Menu.

Click on **Select Client.** Select a client name in the "Select Client" Window. Recorded session data will be saved under this client name. Click the "Select" button. If you skip this step, you will be prompted later to select a client if you record data. (For information on adding new clients, editing, and deleting client records, please see the "Adding and Deleting Client Information" section.)

Next, click on **Run Session**. This will bring up the Select Application window.
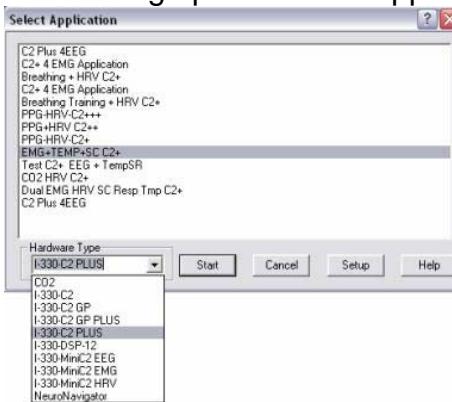
Make sure that the PHYSIOLAB **device** that you have connected to your computer is selected in the "Hardware Type" drop-down box. Each hardware type has its own unique application list. Click on the name of the **application** that you wish to run. Click **Start**.

If you receive an error message, click **OK**; check the connection to your computer, then retry. If you have trouble starting a session, please refer to the "Troubleshooting" section in your Hardware Guide.
IMPORTANT: Once you have started an application you must exit it using the arrow in the lower left-hand corner, **NOT** the red X in the upper right-hand corner.

Ensuring a Good Connection

This section only applies to those users who detect IBI using the ECG wrist-to-wrist sensors. If you are using the RV PPG sensor, impedance does not apply.

For ECG, skin prep is critical. For researchers, we recommend a gelled electrode. The best placements are across the chest. For clinicians, we like our gelless wrist-to-wrist ECG electrodes.   Use alcohol on the skin and on the electrodes to keep them moist. Some combine alcohol and salt water, in dry climates. Be careful not to form a moisture bridge, which shots out the electrodes.

In every application session, the first screen you will see is the **Sensor Test Screen.** Hook up the sensors using the picture as a guide. Please refer also to your Hardware Guide for information on cable/electrode configurations for your device and connection tips for different modalities.

IMPEDANCE: The Sensor Test Screen displays the **impedance** of each ECG electrode as a bar graph. The digital bar values are in K Ohms (K=1000 Ohms). J&J's impedance testing feature is important because it enables you to determine the quality of your signals. High impedance levels allow environmental electrical noise to contaminate your signals. Values in the green range indicate optimal functioning, yellow indicates marginal functioning and red indicates that the connection is inadequate and needs attention. (Please see the "Impedance Testing" section of your Hardware Guide.) The bar colors are intended as guidelines only. The values needed to ensure good signals are dependent upon the amount of electrical noise in

your location and the signal level of interest. (For more information please see the "Artifact Detection" section in your Hardware Guide.)
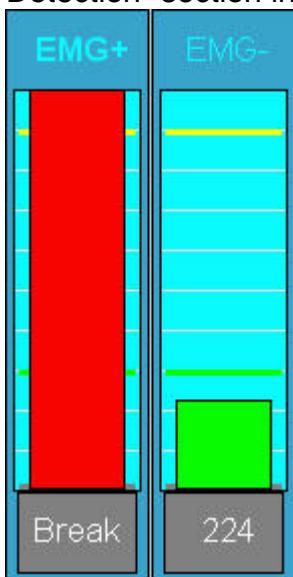
Are the Electrodes making good contact?

- Simple Impedance Test: Remove completely from the skin.
- Find a greed ground electrode.
- Use either the green electrode on the 3-wire ECG the Green finger skin conductance electrode on the SC cable.
- Snap on 3 electrode pellets. Put some gel on them to increase conductance.
- Touch the positive electrode to the green ground.
- The Impedance Bar should go down into the green.
- Touch the positive electrode to the green ground.
- The Impedance Bar should go down into the green.

- If no color change or 'break' continues, the cable or snap connect is cut or degraded.
- If not, the problem is in the skin preparation. The alcohol or cream or gel must SATURATE abraded skin and form a moist connection.

Are you really preparing the skin properly?
- Skin can be dry or oily, clean or covered with lotion or makeup. It does not matter. ALWAYS 'abrade' the skin with a pad, using circular motions. And scrub hard - the skin should look red. Use an abrasive lotion. Use alcohol to remove residue, and scrub in circles with a dry pad. The idea is to remove dead skin.
- Ready? Do not put the electrodes on yet. Use a cue-tip to put a dab of electrode gel on the spot where the electrode will be placed. Spin the gel into the skin.
- Place the pre-gelled electrodes over the sites and ask the client to press hard around the edges.
- Now test impedance.
- Remember that impedance is proportional to the degree that the alcohol or gel merges with the skin. Often as the skin warms the gel makes better contact and impedance improves over 5 or 10 minutes.

- Low EEG Impedance is most critical!
  - Poor EEG impedance .will generate artifact that is amplified in the low delta-theta frequencies. Your 'neurofeedback' training could be biased, giving false 'theta' bursts. EEG impedance.

- EMG is less critical, and ECG even less. The key to ECG is getting a clear R-wave for the IBI detector.

- Signal bars for modalities other than EMG/ECG/EEG display green for normal operation, yellow for needing adjustment, and red for disconnected or broken.

For devices powered by batteries, a **digital battery indicator** display near the bottom of these screen tests and displays the remaining voltage.

Checking For Good Signal Data

Click on **Check Signals**.

- This screen displays all signals available in the application and currently being acquired so that you can inspect them to verify that they appear in normal ranges. It is not intended for feedback.
- In Applications with ECG, it includes a **frequency spectrum (FFT) display** which is particularly useful for detecting environmental electrical noise.
    - Remember that the 'live HRV' spectrum is flat for the first 64 beats. Mathematically it takes 64 beats for the spectrum to emerge. From then on, it updates beat by beat for the preceding 64 beats.
    -

    Sensor Test and Check Signals are designed to ensure the quality of your data. You should check these functions each time you start an application.

Session Control Toolbar

All HRV researchers need to record and save their data. Recording can be started manually OR - IN SPECIAL APPLICATIONS – BY PRESSING A SCREEN BUTTON.

Physiolab applications do this manually by pressing the Run button to Record. Press it again to stop. Then select EXIT to save.

Special applications like Resonant Frequency Test in the EC application library require that you do not press the red Run button. Instead you press a large button on the Select Task Screen. Once pressed, it will automatically take care of recording, pausing for instructions, and ending a sequence of tasks.

Here is a review of key buttons to manipulate and control a session and its screens:

The **Session Control Toolbar** at the bottom of your screen provides controls for specifying tasks, recording data, marking events in the data, and for invoking various screen features such as screen freeze and sweep reset.

Exiting a Session

This step is critical. If you fail to save properly, you will loose your data.

Exit each session using the arrow in the lower left hand corner

- In order to review data, generate reports, export data into a database, manage client or session data, or to quit the program, you must first exit the session. In order to exit the software both the Pause and the Record buttons must be OFF. If you have recorded data, the Save Session Data window will automatically open when you exit the software (See the Saving Session Data section).

EXITING A SESSION

EXITING SOMETIMES REQUIRES TWO OR THREE STEPS.
The key is to follow the instructions in the bottom Information Bar's BLACK BOX.

Task | EMG Feedback Session | REC | Task: Elapsed | 00:00:04 | Remaining | 00:19:56 | Sessic

- **EXIT when CLEAR:**
- If the box is blank .... , or says a simple 'pause', like this. **PAUSE** just press EXIT
  .

PROBLEMS EXITING – and SOLUTIONS:

- However-If box says REC. First STOP RECORDING:

- If box turns blank .... press EXIT

- However If box says **PAUSE 1:33 remain**, , your Task Sequence is still enabled.

  To abort, first GET OUT of Pause. Press the grey toolbar [] [] Pause button.   REC resumes.

  This is correct. When REC resumes, click on the red Rec Button .
  The black box will clear and Now you can EXIT..

Recording Data

- The **Record** button toggles recording on and off. NOTE: The color difference
  between on and off is hard to see. Look on the black event box on the bottom center
  toolbar to see if it says REC. or is blank

- The **Pause** button pauses data recording. Re-click it to resume recording. Look on
  the black event box on the bottom center toolbar to see if it says PAUSE . or is blank

  - The **Menu** button allows you to specify the erase time interval invoked by the
    Record Backup button.

  - The **Record Backup** button erases a specified time interval of recorded
    data, and records over the erased portion so that the data record is seamless.
    You can change the Backup interval using the Menu button.

  - The **Task Averaging** button opens a window that lists the mean average for
    each signal and each task as it is recorded. It verifies what is being recorded.

Event Marking

- You may use the event marker to make brief notes while recording. These notes are
  saved, and will appear in the Excel spreadsheets. The notes will not be seen in the
  saved IBI data folder.

- The **Event Mark** button enables you to add data markers into the recorded data
  when significant events occur during the session. The button pops up a window into
  which you can type a name or brief comment which is inserted with the marker into the
  data record.
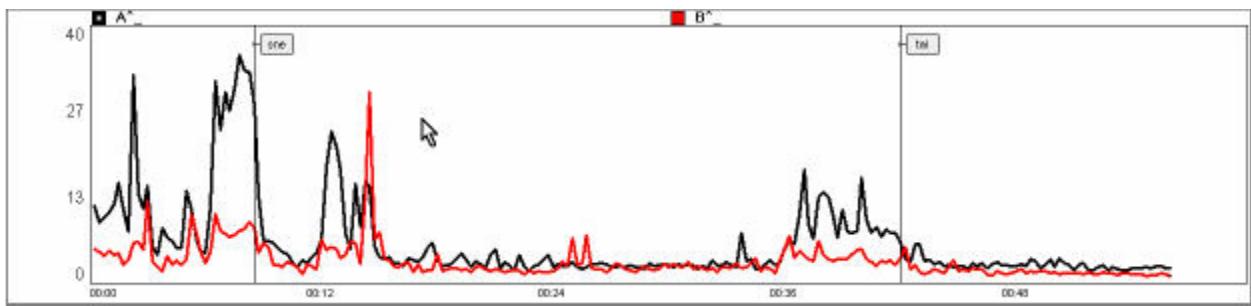
- Character limit for marker label is 3 characters, like '123,' 'abc,' or 'bl1.'
-

END OF SECTION

Saving Session Data, Saving Last Settings & Verifying Client Names

Always save to database first, even if you don't use the data that way. The IBI data is saved along with the regular, Excel-style data. This means you can come back later, retrieve the session data, and convert it to the IBI data format needed by Kubios.

Here is a review of how to save session data properly.
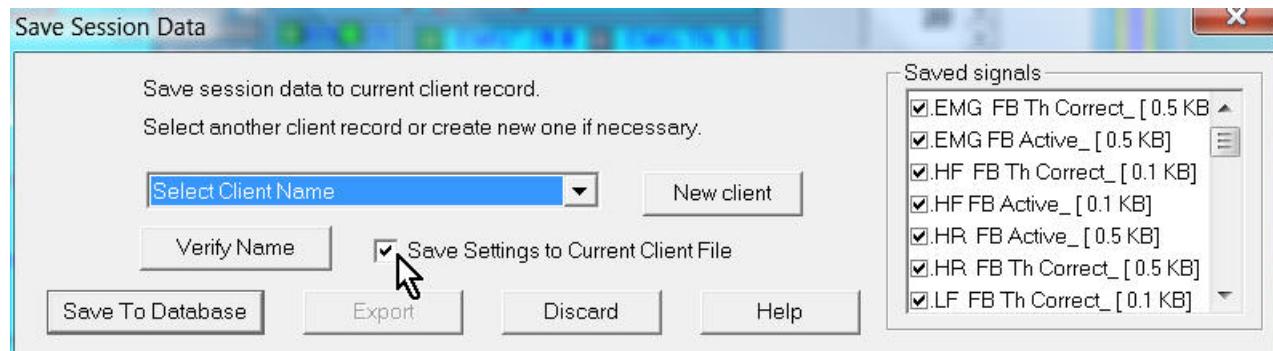
If you have recorded any data, the **Save Session Data Window** will automatically open when you exit the software (using the lower left-hand Exit Arrow). You have the option of discarding the data or saving the data to a specific client name file. The names displayed in the dropdown box are alias names. You may select any alias name in the drop down box. In order to verify that the alias refers to the client that you intend, click **Verify Name**.
If you did not select a client name before you ran the session, you can click **New Client** and enter client information after exiting the session. For directions on entering client data see the "Managing Client Information" section)

Signal names that are checked will be saved. You may uncheck those signals that you do not wish to save.

If a specific client was selected before the start of the session, their last set of settings may be saved to the client file. Make sure that **Save Settings to Current Client File** is checked, and **Save to Database**.

Click **Save to Database**. After saving or discarding data, click the X to close the Save window.

If you click Export before closing the Save window, you have the option of exporting the current session data to Excel or to another database as described in the Exporting Data section.

END OF SECTION

Managing Data and IBI Conversion

The place to convert the J&J data file to IBI data format is started here, with Manage Data. The IBI conversion takes place in the EXPORT window. Details are given below:

If you are running a session, stop data recording, exit the session to the Physiolab Main Menu and click **Manage Data**.
It will take you to the View Session box:
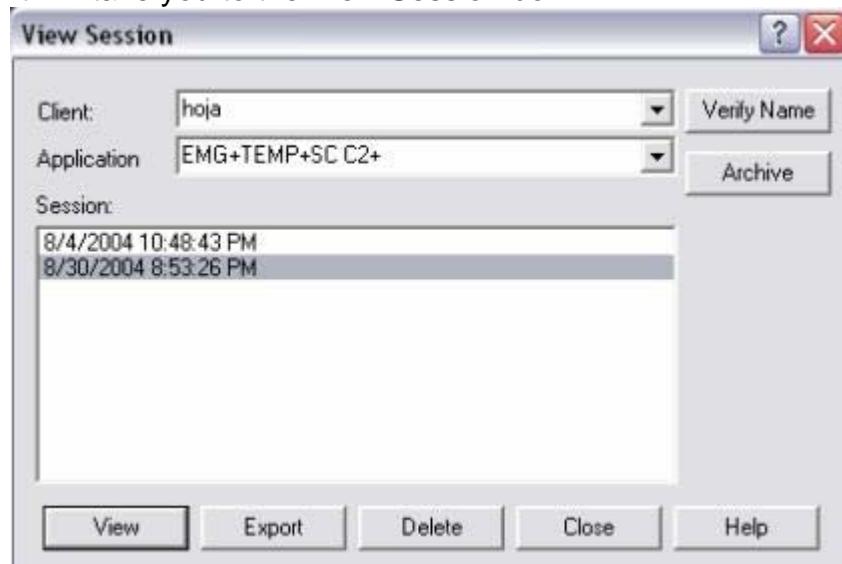
In the View Session window, select a client alias in the top drop-down box. If you wish to see the client name, click Verify Name. Select the application you used to record data in the second drop down box, and then click on a session date and time to select it.

At this point you can view data and generate reports, export data to Excel or another database, delete data or archive data.

(Troubleshooting Tip: If the session data you are looking for is not present in the session window, it was probably collected under a different application name. Select a different application in the second drop-down window.)

Deleting Session Data
If you wish to discard session data follow the steps above to get to the View Session window, highlight the session date and time, then click **Delete**. To delete an entire client record including all session data for that client, see the "Adding and Deleting Client Information" section.

WHAT GETS CONVERTED?

So how does this work? Here is a look inside of the IBI conversion file set up fro Kubios Analysis. The picture shows a single column of numbers in column A of an Excel spreadsheet . [The Excel spreadsheet is not used by Kubios. It is used here to help you visualize how Physiolab converts IBIs.]

Microsoft Excel - __1

File Edit View Insert Format Tools Chart Window Help Adobe PDF

	A	B	C	D	E	F	G	H	I	J
1	1574									
2	1705									
3	791									
4	849									
5	771									
6	884									
7	847									
8	833									
9	791									
10	773									
11	792									
12	794									
13	769									
14	777									
15	791									
16	759									
17	785									
18	806									
19	824									
20	818									
21	837									
22	820									
23	777									
24	826									
25	839									
26	824									
27	847									
28	835									
29	802									
30	808									
31	816									
32	824									
33	857									
34	794									
35	808									
36	814									
37	822									
38	830									
39	824									
40	767									
41	751									
42	773									
43	800									
44	802									
45	806									
46	773									
47	800									
48	851									
49	941									
50	966									
51	869									
52	849									
53	847									
54	779									
55	767									
56	812									
57	763									
58	791									
59	794									
60	281									
61	494									
62	765									
63	769									
64	804									

Chart
Chart Area

__1

There is only one column of data, in column A. The scale is in msec. One second is 1000. Here we see 64 rows, one for each IBI. This is about one minute of saved IBI data. The graph, also from Excel, shows the column data as a graph of each IBI by each sequential beat [row]. Note the anomalies, the spikes at the beginning and middle of the graph. Kubios software allows you to filter out these anomalies and deal with a corrected data file. Since HRV calculations can be distorted by an occasional skipped or double beat, this assures that the corrected data file reflects regular HR cycles needed for plotting HRV.

EXPORT TO Kubios for HRV Analysis

Here is how to convert Physiolab IBI data to IBI data detectable in the Kubios HRV Analysis program.
Once converted, use the instructions supplied with that program for importing and manipulating data.
KEY POINT: For those of you who jump ahead, to import the converted data, run Kubios, open the folder you saved the converted IBI data, and you will at first see nothing. The folder will appear blank. It is not blank. Select All Files, and you will see your saved .asc files. Highlight and open.

Now, how do you convert your saved data to the Kubios format?
First check that your program does indeed save a signal with the exact name 'IBI_.'

Does your program save IBI data? Look at the Export Signals list. If it shows 'IBI_' you can use the IBI export function. If you do not have this signal, the IBI conversion will not work. Older programs that have 'Period_' signals also will not work.
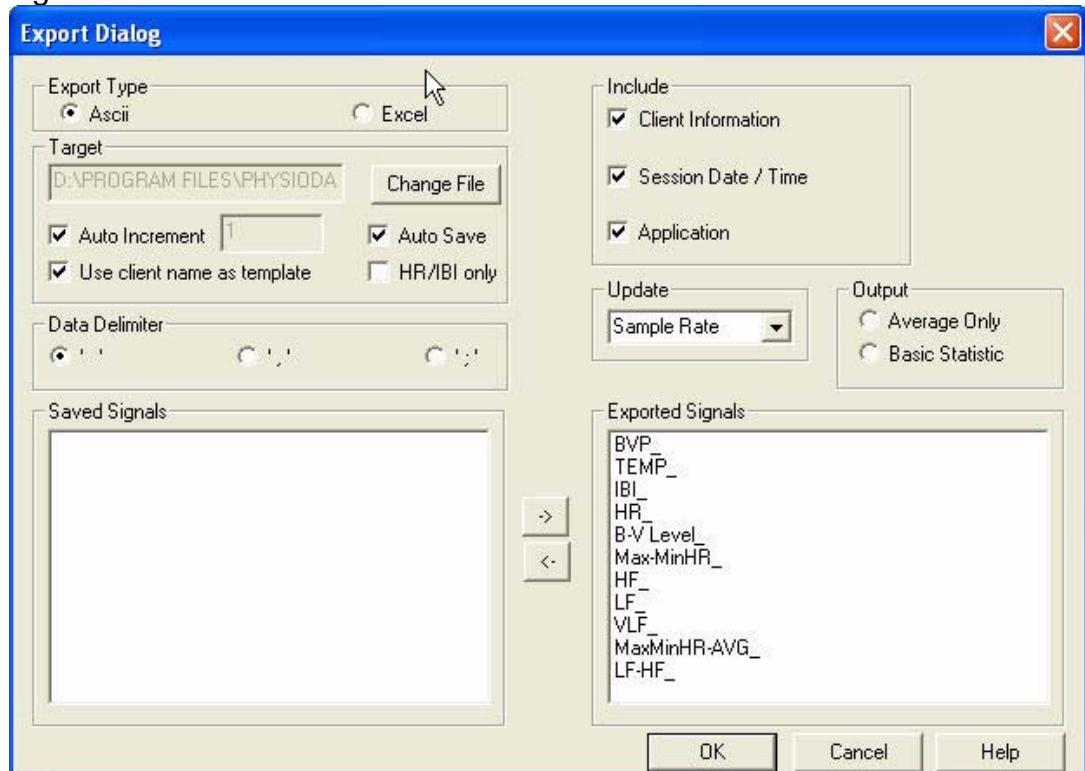
The box, HR/IBI only ' is unchecked. To activate IBI conversion, check this box.
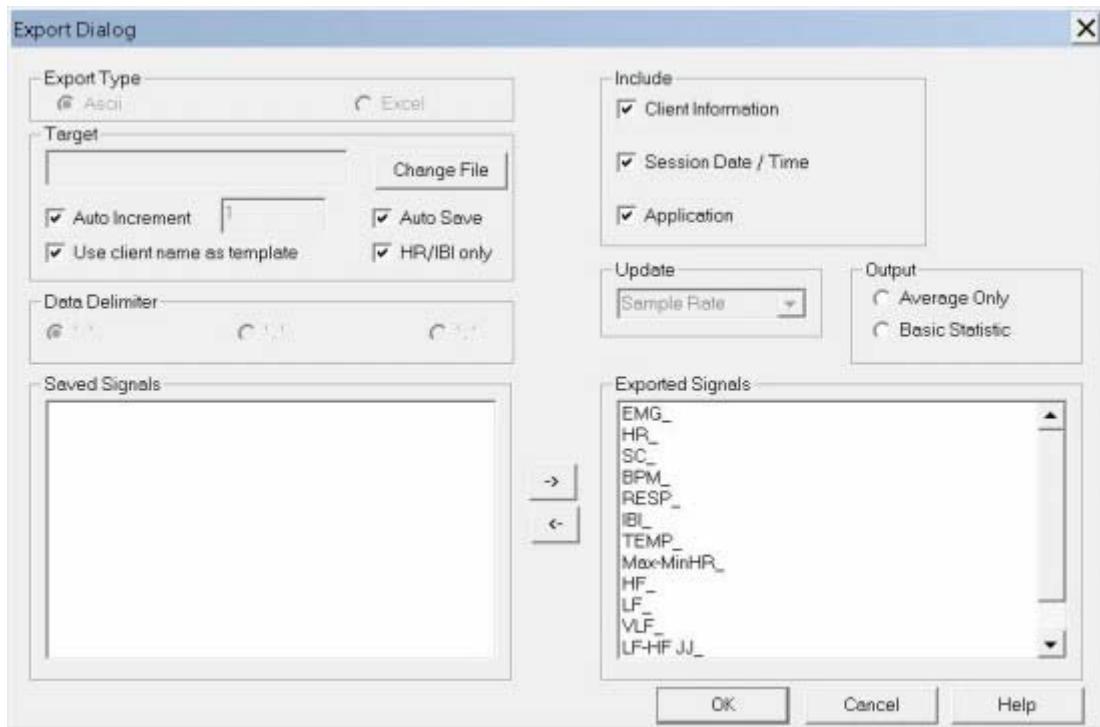
Here 'IBI_' is an exported signal, so we can check, 'HR/IBI only.'

NOTE: The other selections on this dialog box are not involved in IBI conversion: Data Delimiter, Update, Output and Saved/Export Signals.

You must click **Change File** to specify an initial target location.
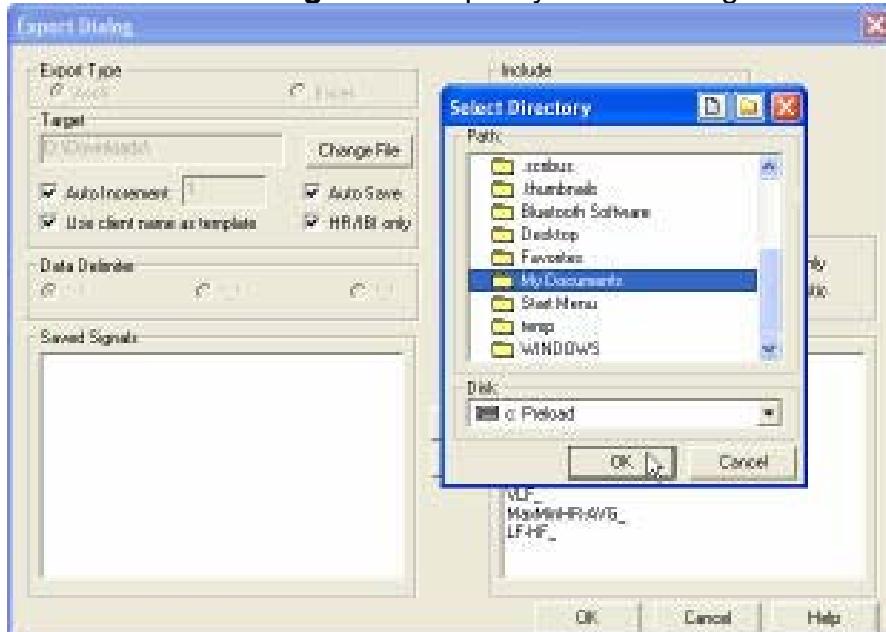
In the pop-up window, browse to the folder into which you want to save the data. You must replace the asterisk (*) with a unique filename, then click **Open**.

FOLDER STRUCTURE RECOMMENDATION: If you have a lot of data, think through how you will be storing and retrieving each session.

- If you have two or more groups, consider saving to two or more separate folders. E.g. **Control vs Experimental**.
- If you are doing a within subjects design, consider an **All Data** folder, with subfolder for **Baselines, Task1, and Recovery**, for example.

WARNING: OK, not Close. Do not close the Export Dialog window using the X in the upper right corner. The file will not be saved until you click **OK** in the Export Dialog window.

Automatically Generating Filenames for Export Data
Once you have used Change File to specify an initial target location and filename, you can let Physiolab automatically generate a new filename and export to your initially specified location by default each time you export data.
When you click **Export** the next time, the target location and filename from your last export will be used again unless you specify something different.

  o *WARNING: It is important to select **Auto Increment** in the Export Dialog window or the exported data will overwrite the previously saved file with the same filename. When Auto Increment is checked, the number in the Auto Increment textbox will be added to your initial filename.*

-
  When you click **OK** at the bottom of the Export Dialog window, the data will be exported and the Auto Increment number will increase by one integer.

  - **RESET AUTO-INCREMENT:** You can start Auto Increment over at zero or at any other number you choose by typing that number in the textbox to the right of the Auto Increment check box.

  - **MANUAL OVERRIDE:** Even with Auto Increment selected, you always have the option of manually specifying a unique filename by clicking on the "Change File" button, typing your new filename, and then clicking Open. The number in the Auto Increment textbox will be added to your manually typed filename when you click OK in the Export Dialog window to export your data. This new filename will become the new default template filename unless you change it back.

To automatically generate data export filenames using a client name as the filename template, both the **Use client name as Template** and the **Auto Increment** checkboxes must be checked.

Even if you have exported data before using "Change File" to specify a location, you must specify an initial target location again when switching to using the client name as a filename template. When "Use client name as a template" is checked, the "Change File" button opens a window to select a file export location only, without a textbox for specifying a filename. Browse to the data destination folder of your choice, and then click **OK** to confirm your target location and close the window. Click OK in the Export Dialog window to export your data.

EXPORT SETTINGS LAST SAVED: For future data exports, once you have selected a data session and clicked Export, your target location and filename will be automatically set and you will need to simply click OK to export.

INSTALL HINTS FOR KUBIOS:

Kubios has a fine installation guide in pdf format. It also provides an excellent review of aspects of HRV plots.

Installation instructions
Windows

Make sure that you have administrator privileges and run the Kubios HRV installer file (KubiosHRV_2.0_installer.exe).

Follow the instructions given in the setup wizard to complete installation. You can launch the Kubios HRV by selecting it from the created Start Menu folder or by clicking the Desktop icon (if created). Please note that the starting of Kubios HRV also starts the MATLAB® Compiler Runtime and may take some time especially with older computers.
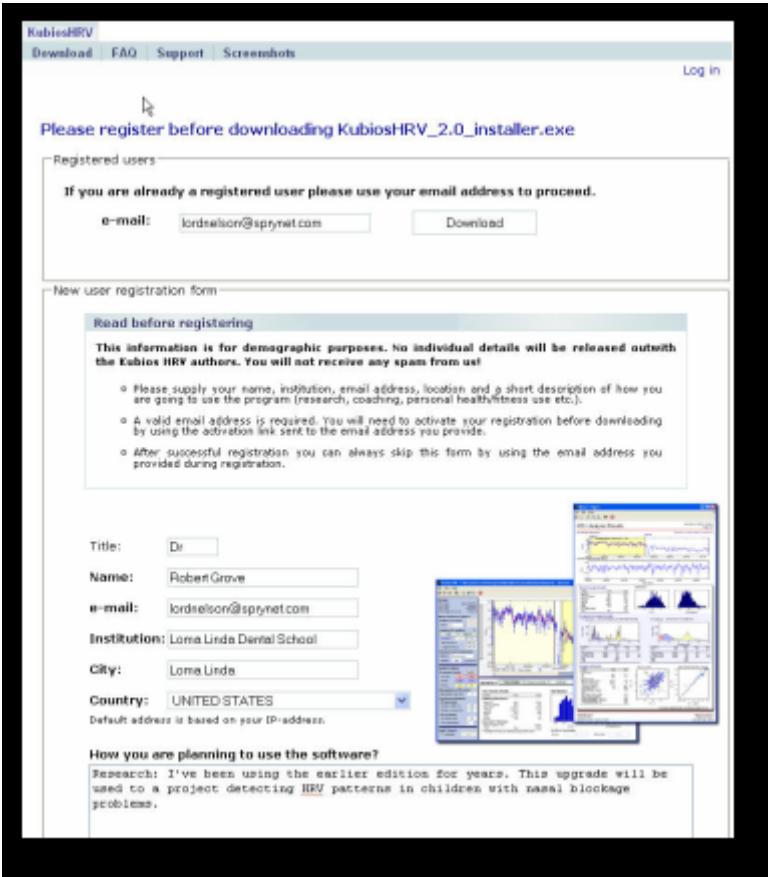
Figure 1. Register to ask for downloads. Read carefully. Clinician-researchers qualify.
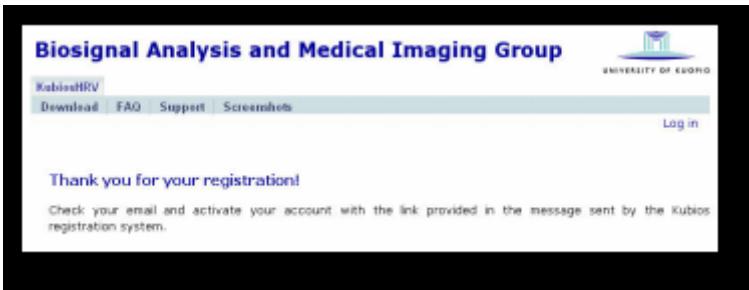
Figure 2. You will receive an acceptance or denial.
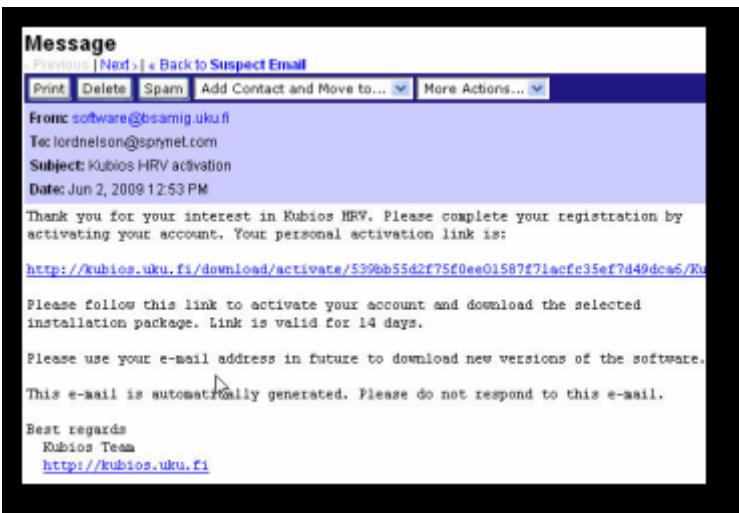
Figure 3. Here is an acceptance. Go to the link provided.

Figure 4. Download and save.

How To OPEN IBI conversion Files:
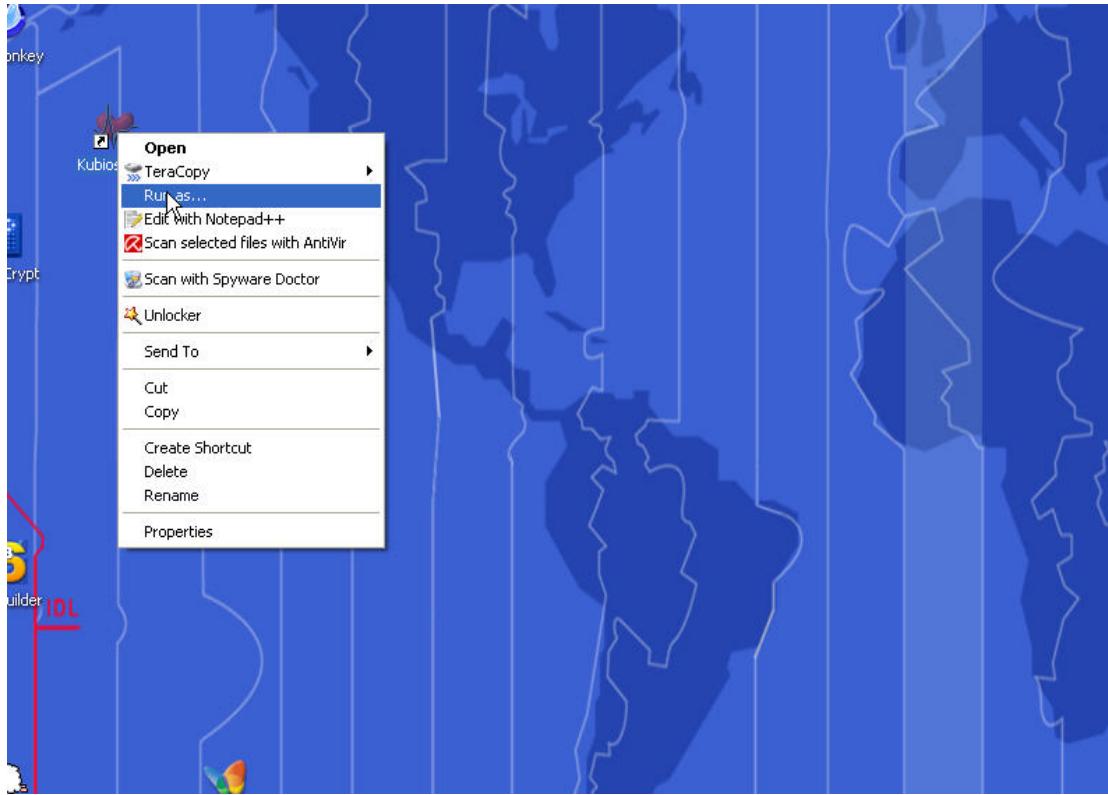
Figure 5 Problem starting? Run as Administrator.

Figure 6 Deselect 'Protect ...'' to run in Admin mode.
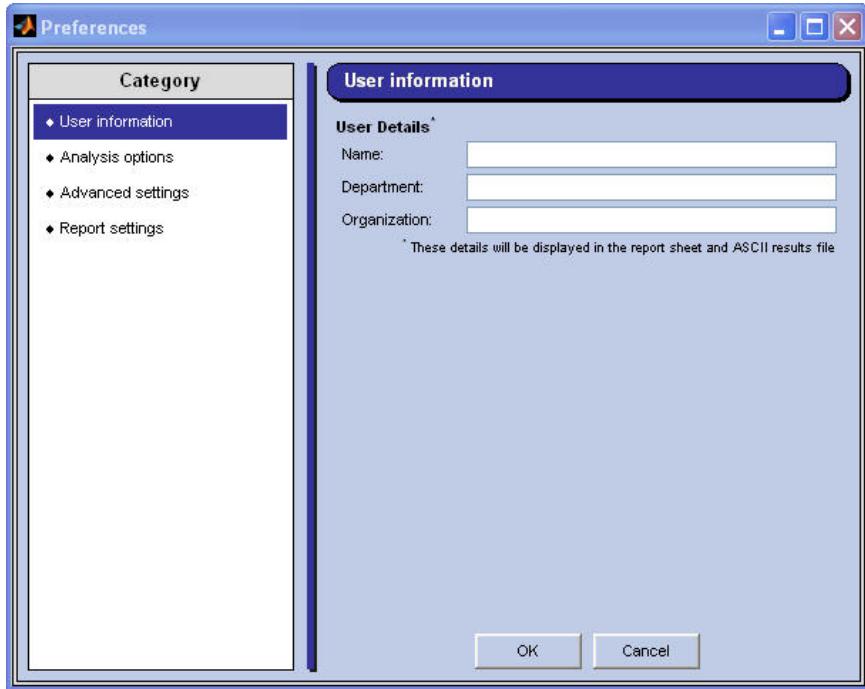
Figure 7 Enter your User Info, then go to analysis Option...
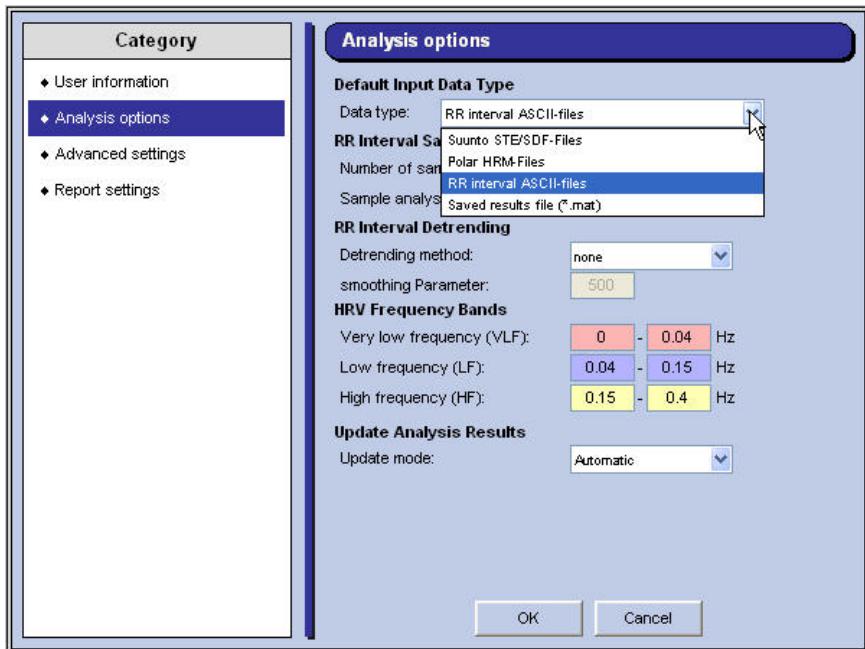
Figure 8. Select RR Interval...
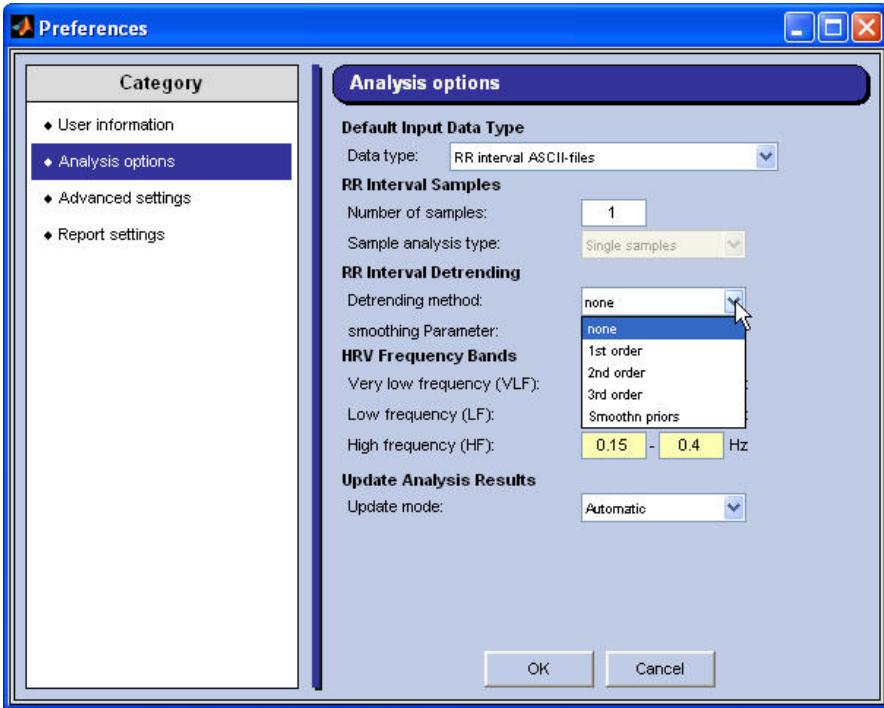
Figure 9. At first, select none for RR Detrending..
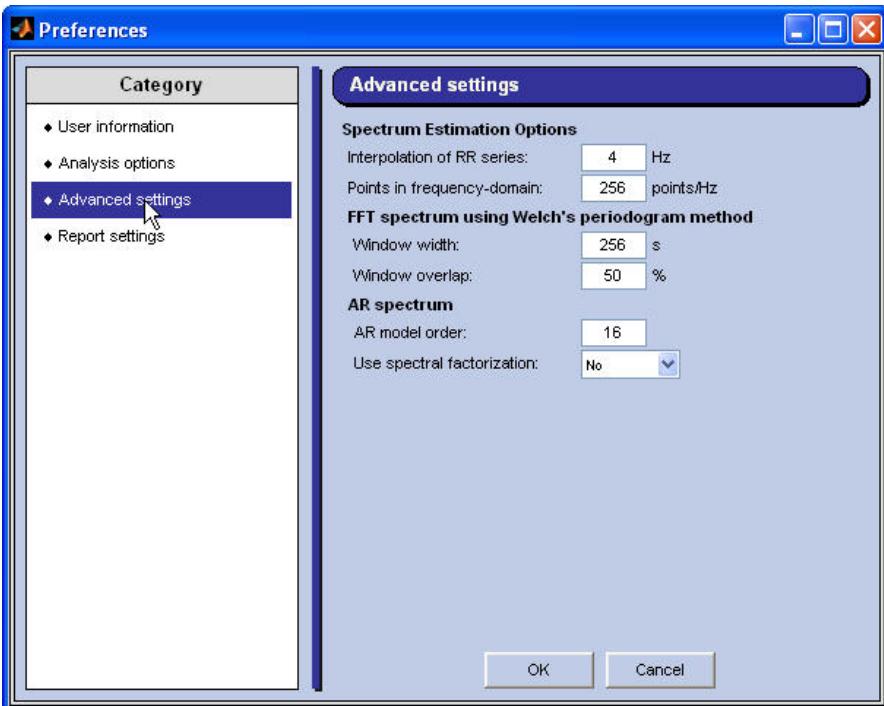
Figure 10. Unless instructed otherwise, keep these at the default values.
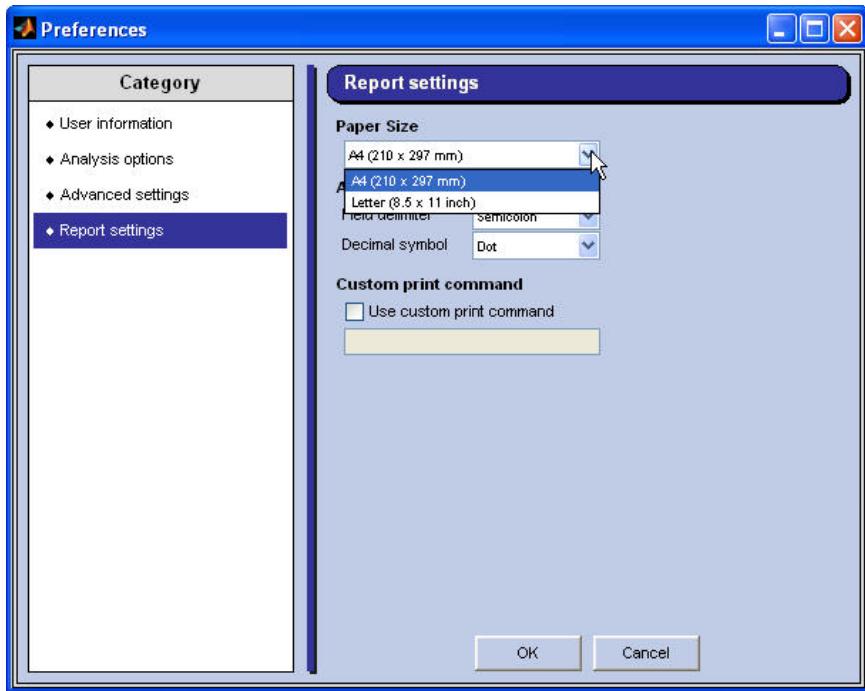
Figure 11. Select your printer's default paper type.

OPEN the Physiolab IBI data file. Not sure where you saved it? Do a search on .asc file extensions.
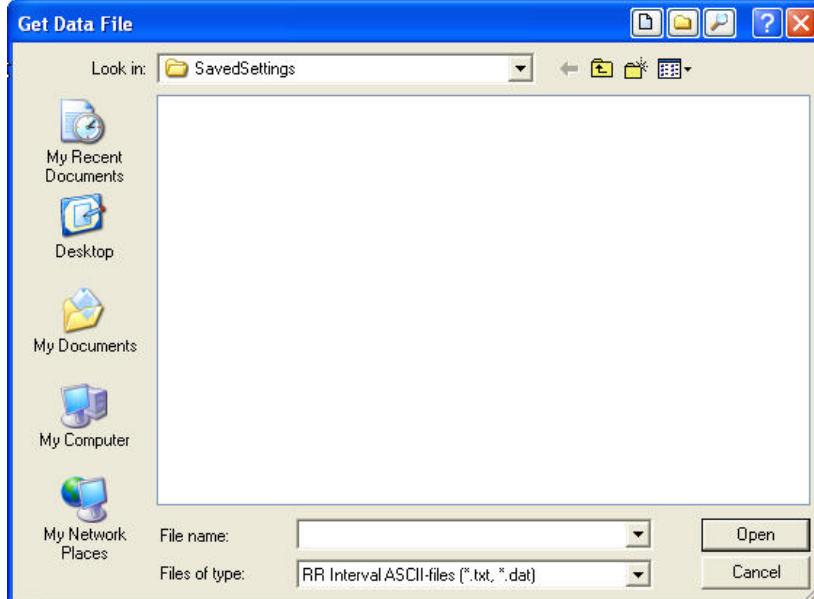
Figure 12. This folder is not blank. Select File Type - All Files.
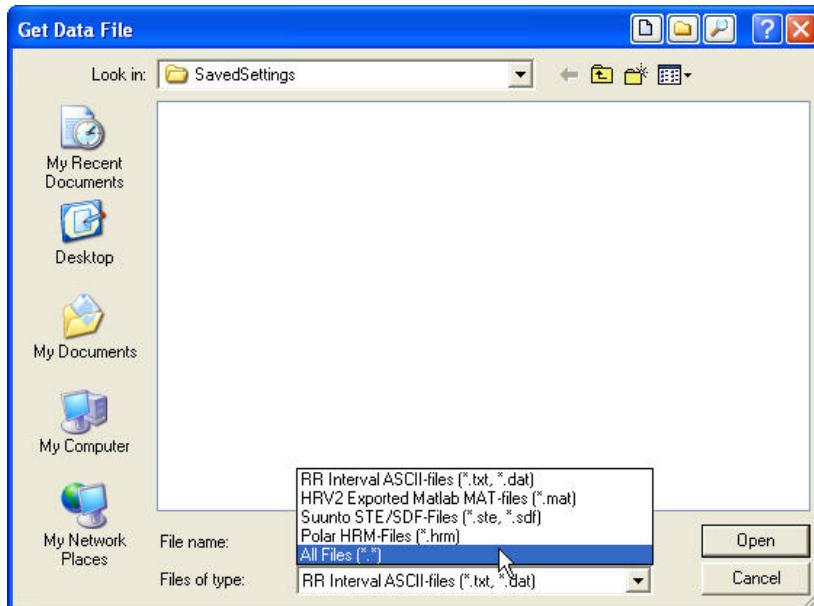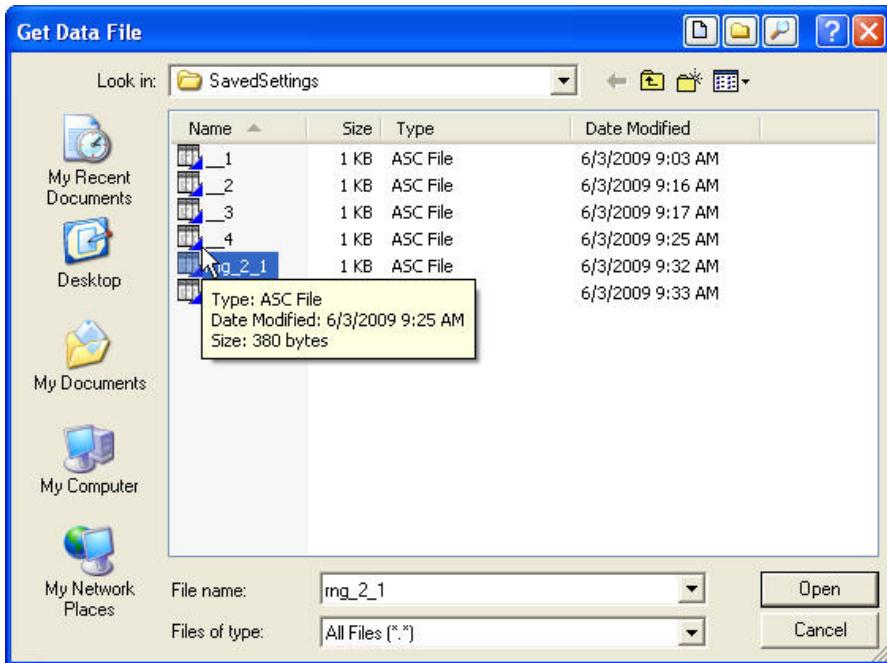
Figure 13. Select the file for analyis. Here we look at rng_2_1.asc.
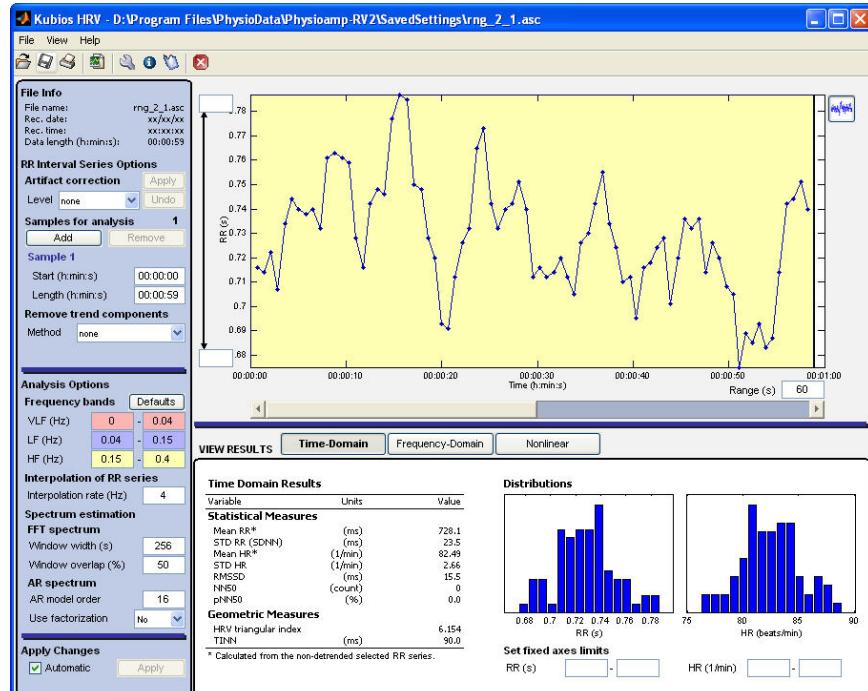
Figure 14. Here is the raw IBI data. We want ro correct for artifact...
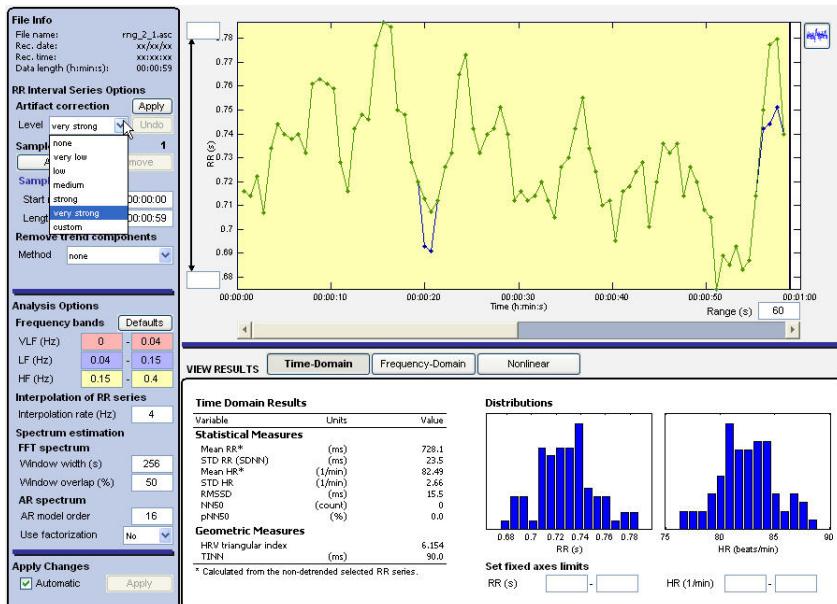
Figure 15. Very strong artifact correction filters some extremes. Time domain is more normal, too.
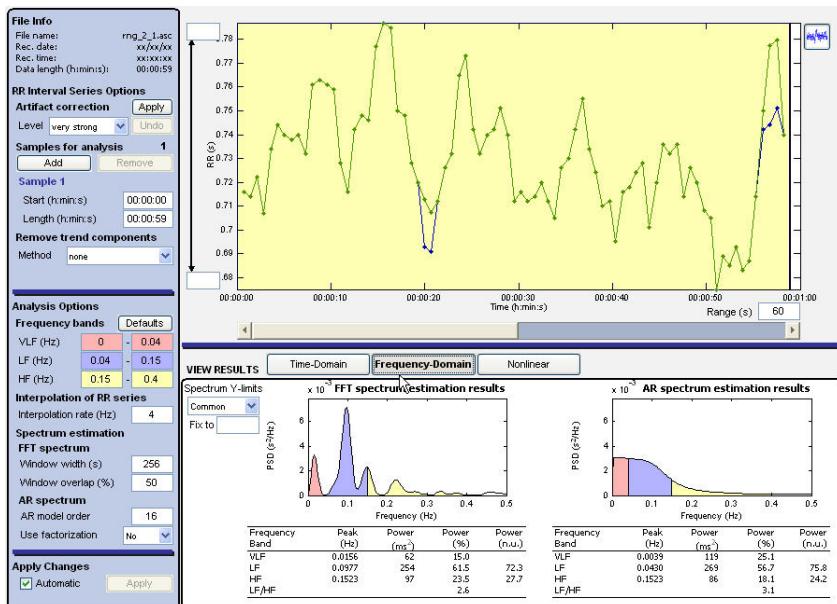
Figure 16. What about HRV Frequencies? Click on Frequency Domaine.
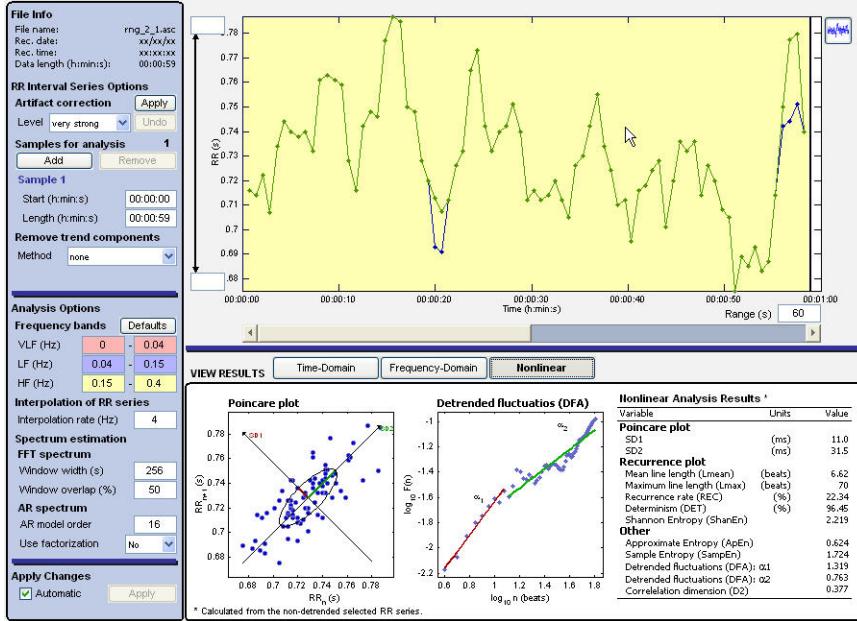
Figure 17. Click on non-linear for Poincare plots and detrended plots.
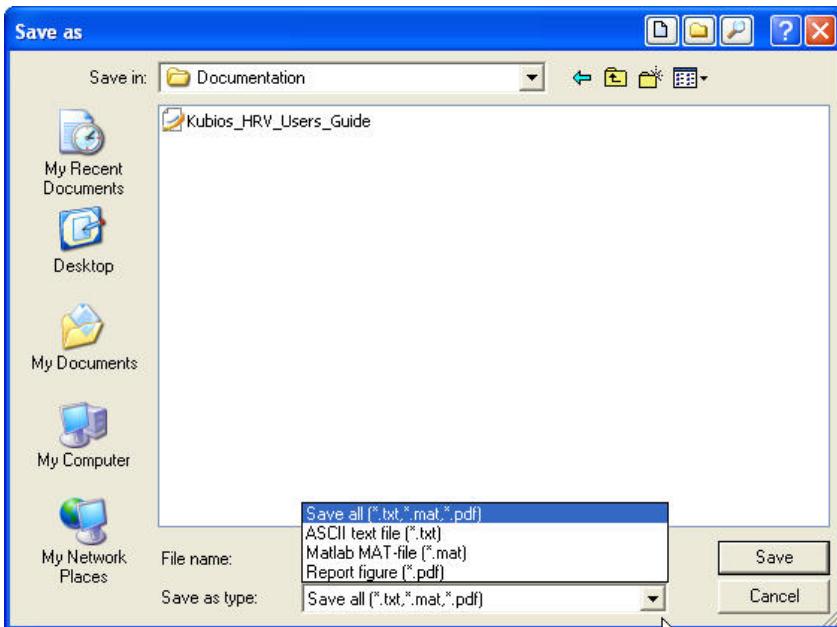
Figure 18. Done? Save to ASCII text file for use in an Excel or statistical package. See Kubios manual for options.

REMINDER: You must set up the defaults properly to code your data. Use the client file name, auto-increment, autosave and include client info.

KUBIOS IBI IS NOT COMPATIBLE WITH EXCEL IBI.
Remember that if you have other data like respiration, temperature or EMG as Exported Signals, you can save that data to Excel directly, and select form the spreadsheet other types of analyses. Excel also exports an 'IBI_' column of signals, but they are not like the IBI conversion files. These IBIs are averaged every 1/10 second, and will show a different distribution of signals than the IBI conversion. We recommend using HR as the primary beat data for Excel and exclusing IBI data from Excel comparisons.

Export Dialog

Export Type
- ○ Ascii
- ○ Excel

Target
D:\Downloads\   [Change File]

- ☑ Auto Increment 1
- ☑ Use client name as template
- ☑ Auto Save
- ☑ HR/IBI only

Data Delimiter
- ○ ' '
- ○ ','
- ○ ';'

Include
- ☑ Client Information
- ☑ Session Date / Time
- ☑ Application

Update
Sample Rate ▼

Output
- ○ Average Only
- ○ Basic Statistic

Saved Signals

Exported Signals
BVP_
TEMP_
HR_
B-V Level_
Max-MinHR_
HF_
LF_
VLF_
MaxMinHR-AVG_
LF-HF_

->
<-

[OK] [Cancel] [Help]
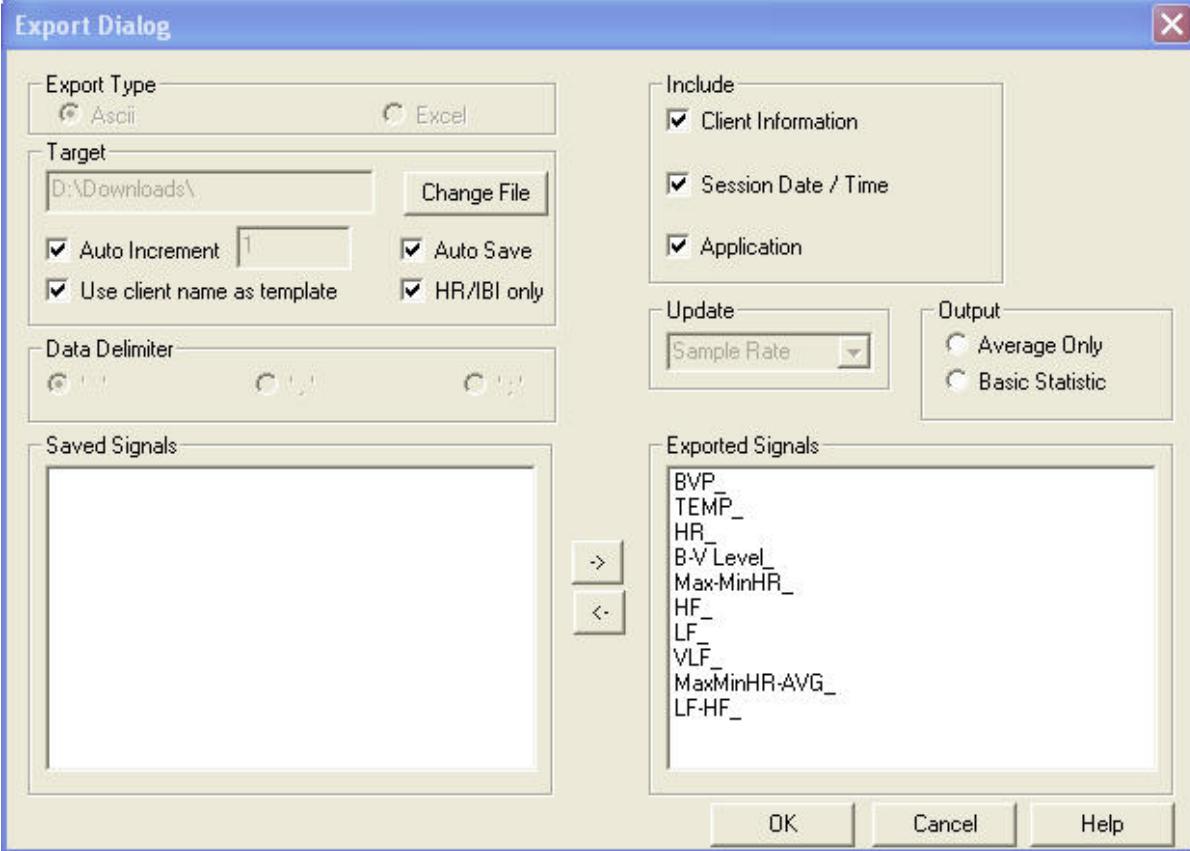
APPENDIX:

Archieving

Before too long, you will run out of space to save your session data. Physiolab has a 1 GB limit to stored data. And you really need to back up your saved data anyway, in case your computer crashes in the middle of your study. Here is where you need to learn to archive your data every work day.

Archiving Session Data

Achieving is essential to back up your data files, to protect in case of computer failure, and to sort sessions together in a research project.

> SIDEBAR: Archiving to a folder can be very beneficial for supervision.
> Your interns can email session data for a single client or a group of clients.
> Researchers can archive session data by protocol, for example, putting all pain clients into a pain-stress profile folder.

One GB Maximum Limit on stored data for all sessions.

The achieve function is critical housekeeping for your data.

-
  After 1 GB of data is reached, the program 'dumps' the oldest files. 'Dumped' files can not be retrieved.
- As a caution, PHYSIOLABhas added an automatic 'warning' pop-up message when the data folder is reaching maximum, but do not rely on it. When you have stored ½ gigabyte of data, you will start getting messages suggesting that you archive files. It is important to respond to these prompts and archive data since you will not be able to access session data if the 1 gigabyte maximum database size is reached.
-

YOU CAN ARCHIEVE DATA IN TWO WAYS:

- Achieve by **Backing up** [archive by copying].
- Achieve by **Clearing** [achieve by moving]
- **Delete File** You can also just 'delete' a file. Once deleted,   Physiolab can not retrieve a' file.

All patient data is saved into the same Physiolab file, called **data.mdb** .
> **FINDING data.mdb:** To find it, use Windows search: 'data.mdb'. There is one data.mdb file for each separate PHYSIOLAB Suite. There is one data.mdb fro the Bundled Suite, another for the 'Classic Suite.' If you purchased and installed additional suites, there will e another data.mdb for another for each: e.g. 'Neurosuite,' etc. Back up and archieve each one separately.

To archive data, click Manage Data on the main entry menu, and then click **Archive.**
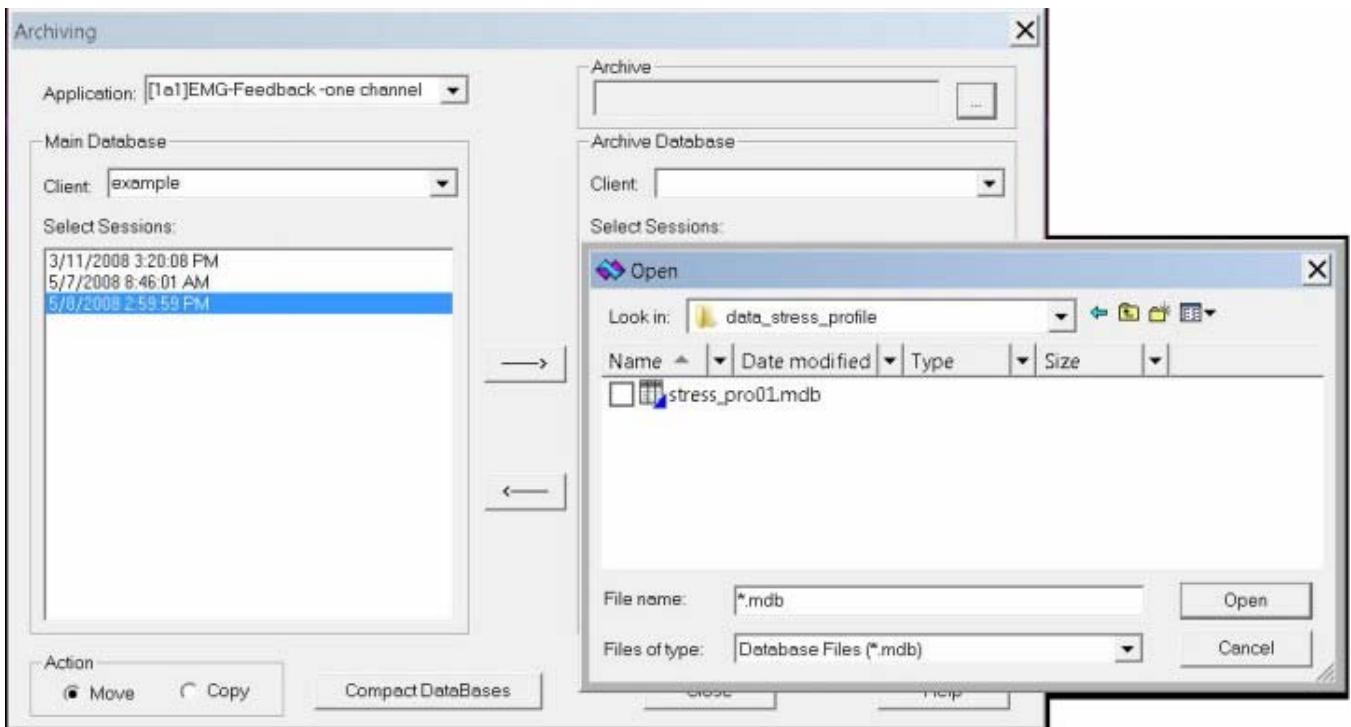
- In the Archiving window, select a **client alias name** in the Main Database drop-down box.
- **Select an application** that has data for the client in the top drop-down box.
- To **select a target folder** location for your archived files, click the small button to the right of the Archive textbox.
- Either select an **archive file name** in the Open window (if you have previously archived data) or browse to the folder location where you wish to create a new archive, type a new name in the "File name" box, like **'stress profile-01.mdb,'** and click **Open**.
- You can choose to have a separate database file for each client or you can archive files by time period (quarterly, half-yearly, etc.)

- Back in the Archiving window, **click on the date of a session** in the list to the left, and then click the right arrow to move it into the list of files to be archived.
- You can **select and move** all files in the list or you can pick and choose sessions by holding down the Control key while clicking on those you wish to archive.
- Finally, click **Compact Databases** to free up space in the Physiolab database, confirm by clicking **yes**, and click **Close** to exit the window.

  o **COPY ONLY:** You can copy a file for a colleague, and keep the original in data.mdb.
  o If you wish to copy a file into a new data location, while leaving the original file in place, follow the procedure for archiving files, but click the Copy dot before you click the right arrow to move files into the right side of the Archiving window (This does not free up space in the data.mdb file). Click Close to exit the window.

  MOVE BACK: You may receive a file from a colleague. To view it, transfer the file back using Archieve window. At any time you can move archived files back into the original Physiolab database to view them. Follow the same procedure for archiving files, but select archived sessions in the right side of the Archiving window and use the left arrow to move them back into Physiolab. However this

only works if you have the same application installed. If someone sends a stress profile, and you do not have that profile in your PHYSIOLAB applications already, you can not move it back or view it.

Using Excel:

In addition to IBI conversion, Physiolab allows you to export data in spreadsheet format. Data is usually saved in 'raw' formate at 10 imes per second for each channel. Yo have the option od exporting at slower sample arters like 1 per second or 10 per minute, in which case the resulting data is averaged as it enters Excel or your statistical package.

Creating Excel Reports

Click on the **Generate Report** button . Accept the default or select the desired averaging interval for your report, click Excel **Report**.

You will see a pre-formatted report generated in Excel with the current Session Review Screen image inserted into the report. You will be prompted to save your report. Browse to your desired folder location and give your Excel report a name, then click "Save". To view or print your report, insert text, or chart data you will need to re-open the report from the location where you saved it.

You can insert rows and merge cells to **create text boxes** for expanding and personalizing your Excel report. Click on the row number to the left above which you wish to insert rows of text. Click on Insert>Rows. Repeat this to insert as many rows as you wish. Left-click on the cell where you want the top left corner of your textbox to be. Holding the left mouse button down, drag the cursor down and to the right to highlight the number of rows and cells desired. In the top menu choose Format>Cells. Click the Alignment tab. In the "Horizontal" drop-down box choose "Left". In the "Vertical" drop-down box choose "Top". Check "Wrap Text" and "Merge Cells". Click OK. You now have a text box in which to insert paragraphs of text. It is best to start with a text box slightly smaller than you think you will need. If you need a larger box, click in the existing text box and, holding the left mouse button down; drag the cursor to highlight cells to the bottom and/or right. . In the top menu choose Format>Cells. On the Alignment tab, click "Wrap Text" and "Merge Cells". Click OK.

You can use the Excel Chart Wizard to **create graphs**. Select single columns of signal data because Excel can only chart one scale at a time.

Click the Chart Wizard Icon in the top menu.

Select the type of chart you want. You can try out different options and view them in the preview window to see which displays of the data are most effective. You may find that your sample rate is too high or too low to create a meaningful chart. You can re-send the report to Excel at a different sample rate using the Excel Report button, resave it to a new filename, and re-chart it using the Excel Chart Wizard.

You can save your Excel report using the File>Save menu commands and/or print out your report using the using the File>Print commands in the Excel menu bar.

Exporting Data to Excel or Your Own Database

Exporting to EXCEL is an easy one-button process, once the two programs – PHYSIOLAB and Excel have been configured properly.

First run a program and EXIT and SAVE.
- You can save twice if you would like, once to J&Js 'Save to Database,' and once to 'EXPORT.' However it is safest to ALWAYS save to J&Js Database BEFORE exporting. You can export J&Js data files at any time to Excel, but if Excel is not working or you erase the spreadsheet, you can only recover by retrieving J&Js Datafile.

So to Export, just select EXPORT from the Data Management Window, check off the signals and Update times and press OK.

KEY POINT: There is a Maximum of 29 allowed Exported Signals
Many applications save more signals than are needed for research. For example, 'HR-Above' is a signal that counts the number of beats above a HR threshold. This is not usually needed for research, so you may wish to 'remove' it [use the back arrow] before exporting to EXCEL.

Exporting data does not affect the original data record. It only exports copies of the data.   To export data, first follow the instructions for selecting session data under the Managing Data section above. Then click **Export**.

In the right side of the Export Dialog window, uncheck any information you do not wish to include. In the **Update drop-down box**, choose the update rate, which is the averaging interval time in seconds (decreasing the rate reduces file size and makes charting the data more feasible).
 Select either **Average Only or Basic Statistic** (described in the Quick Reports section). If you don't want to export all of the signals, highlight individual signals and move them into the Saved Signals box using the left-arrow.
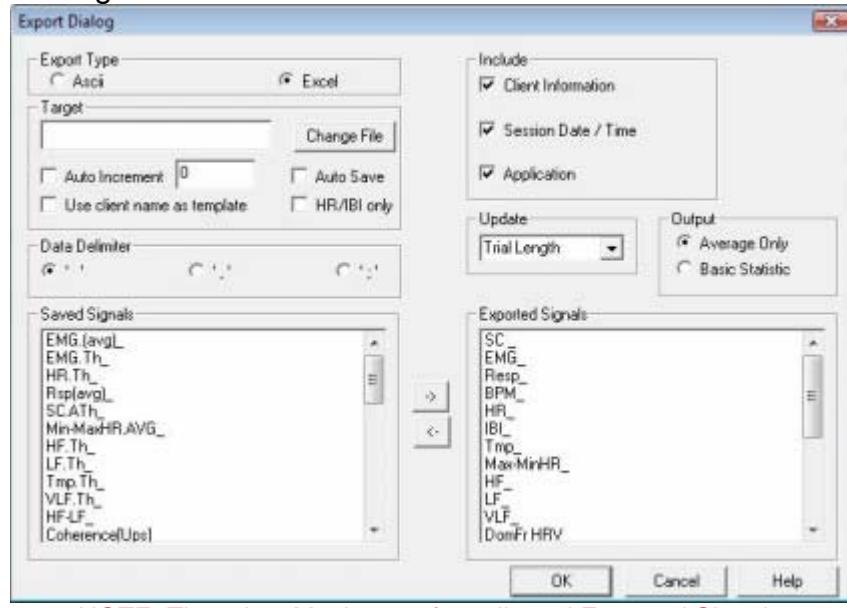
NOTE: There is a Maximum of 29 allowed Exported Signals.

If you wish to **<u>export to Excel</u>**, select **Excel** in the Export Type box and-click **OK**. Click **Yes** in the save prompt pop-up window, browse to a folder location, type in a unique filename and click **Save**. If you wish to include screen captures in your Excel report, or add textboxes or charts, you may want follow the directions in the Creating Excel Reports section instead of exporting data.

If you wish to have Physiolab automatically generate filenames and save to a pre-selected target location, check the **Auto save** checkbox, and then follow the instructions below in the Automatically Generating Filenames section.

When Auto save is checked Excel will pop open and populate with data, then the save window will briefly appear and disappear as the file is automatically saved to your target location, and Excel will close. It may take a few minutes for these steps to execute, especially with large files.
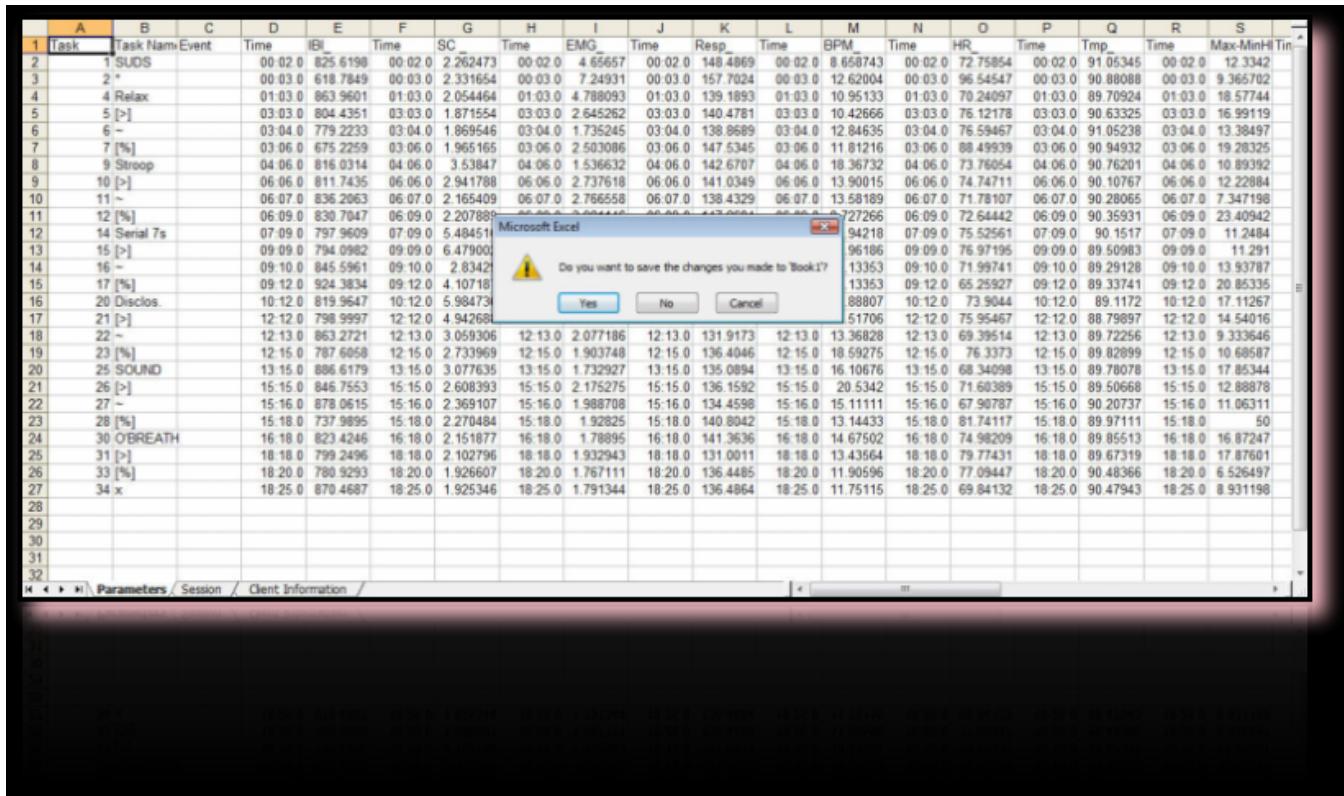
TROUBLESHOOTING:
Some users have reported getting Export Errors.
*   The **General Exception error** provides a spreadsheet with no data columns.*
*   A more frequent error is the a warning of Excel for a moment as the data is written to the spreadsheet, then the **whole Excel program disappears**.*
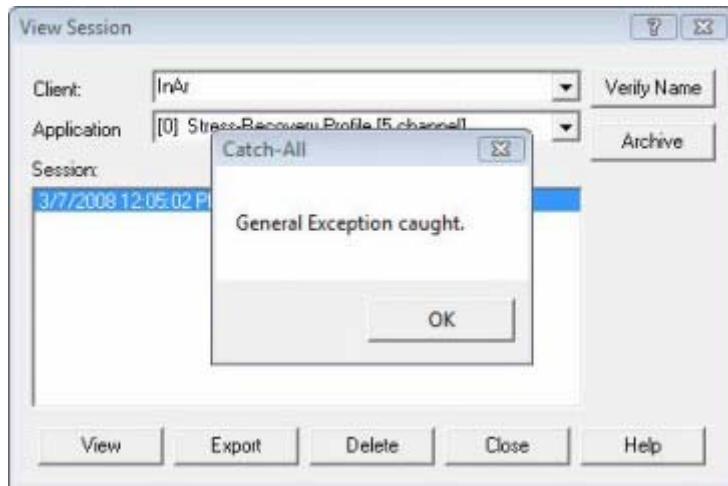
SOLUTIONS:
A careful, step-by-step analysis of this problem revealed no apprent problems with the PHYSIOLABExport program as a whole; however users with these errors can get it to export properly by spending a little time re-configuring the Export Window.
Here is how to get it working again:
1. **Change Update Unit:** Trial Length or 10 sec. seems best for troubleshooting.
2. Use **Average Output**, not Basic Statistics.
3. **Remove** [<--] all **Signals** except for the most basic EMG, HR, Sc, Temp, SUDS, etc:

After each step, press OK to test that EXCEL is now working.

It appears that some attempts to export to Excel do not synchronize cells in the right order for Excel. Once the PHYSIOLABExport Window is re-configured, these problems go away, and everything works.
By re-configuring the Export Window users have been able to 'recover' data sets that many researchers thought were corrupted or beyond salvage.

BOTTOM LINE:
DO NOT ERASE 'BAD' DATA. Save them, and Archieve them. [See How to Archieve].

After Archieving, get hold of Dr. Grove through J&J. He will instruct you to send them to Dr. Grove at a special email address for analysis.

Reminder: Excel may take take a long time to fill a speadsheet. So **be patient** and do nothing until you see the opop-up window:
"Do you want to save the changes you made to Book 1?'
Answer **Yes** to have it Save as 'book1.' This is not recommended, and is only if you are in a hurry!
Click on Cancel, and then "Save As" .. in a follder for later Excell Analyisis.

LIMIT ON NUMBER OF SIGNALS IS 29.

A few applications save more than 29 signals. Some Excel programs limit the number of Excel exports to 29 signals. To see if you have more than 29, count up all the Exported Signals.
Solution: Move unnecessary signals to the left side box, Saved Signals.
When you are left with 29, press OK.

EXPORT TO ACSII: [NOT EXCEL]

If you are using your own database program, use the instructions supplied with that program for importing and manipulating data.

If you wish to **export to another database**, select **Asci** in the Export Type box. You must click **Change File** to specify an initial target location. In the pop-up window, browse to the folder into which you want to save the data. You must replace the asterisk (*) with a unique filename, then click **Open**.

It is important to specify which symbols your database will be looking for in order to interpret divisions between data elements. Click the radio button next to the appropriate symbol combination in the "**Data Delimiter"** box.

Do not close the Export Dialog window using the X in the upper right corner. The file will not be saved until you click **OK** in the Export Dialog window.

Automatically Generating Filenames for Export Data
Once you have used Change File to specify an initial target location and filename, you can let Physiolab automatically generate a new filename and export to your initially specified location by default each time you export data. When you click **Export** the next time, the target location and filename from your last export will be used again unless you specify something different. It is important to select **Auto Increment** in the Export Dialog window or the exported data will overwrite the previously saved file with the same filename. When Auto Increment is checked, the number in the Auto Increment textbox will be added to your initial filename. When you click **OK** at the bottom of the Export Dialog window, the data will be exported and the Auto Increment number will increase by one integer. You can start Auto Increment over at zero or at any other number you choose by typing that number in the textbox to the right of the Auto Increment check box.

Even with Auto Increment selected, you always have the option of manually specifying a unique filename by clicking on the "Change File" button, typing your new filename, and then clicking Open. The number in the Auto Increment textbox will be added to your manually typed filename when you click OK in the Export Dialog window to export your data. This new filename will become the new default template filename unless you change it back.

To automatically generate data export filenames using a client name as the filename template, both the **Use client name as Template** and the **Auto Increment** checkboxes must be checked. Even if you have exported data before using "Change File" to specify a location, you must specify an initial target location again when switching to using the client name as a filename template. When "Use client name as a template" is checked, the "Change File" button opens a window to select a file export location only, without a textbox for specifying a filename. Browse to the data destination folder of your choice, and then click **OK** to confirm your target location and close the window. Click OK in the Export Dialog window to export your data. For future data exports, once you have selected a data session and clicked Export, your target location and filename will be automatically set and you will need to simply click OK to export.

RESEARCH MODE: Setting Up Tasks & IBI

Some researchers wish to run sequences of events and need to set up a strict protocol. This section is a guide to what we call Task Sequencing. It is a little confusing until you figure out that each segment must be saved as you proceed. Saving here is called 'updating' a profile.

Researchers have requested simple ways of presenting a sequence of tasks that are standardized in time per task and in content. A stress profile is a common example. You can record many signals in the standard way, and export them to Excel for spreadsheet analysis. However to conduct a Kubios HRV analysis, you will need to save the data as HR/IBI format, and mark each task manually. More on this later.

First, how do you set up your own sequence of tasks?
Tasks are data recording intervals which can be named to enable interpretation of session data. Task interval marks and color-coded time interval bars are inserted into the graphic record. Task labels are inserted into the recorded data file.

 Specifying Tasks Manually

To manually set up tasks, click on the Select Task icon in the bottom Session Control Toolbar.
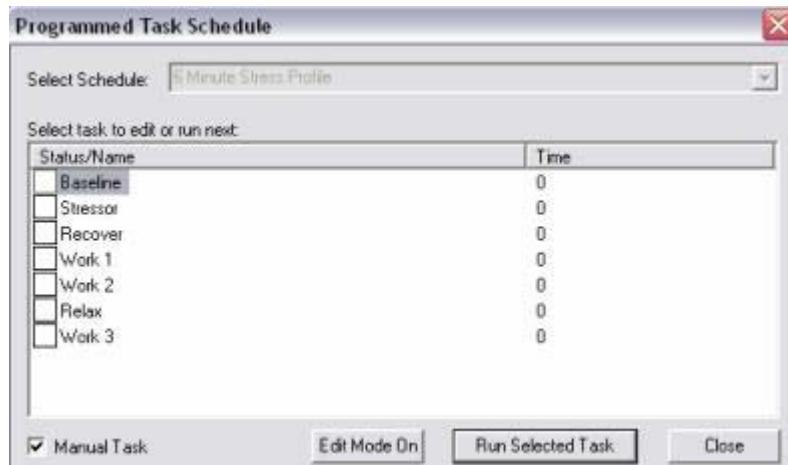
   In the Programmed Task Schedule window, you can select different task labels manually at whatever time intervals you wish. In the lower left-hand corner click **Manual Task** to create a check mark. Click on the desired **task name** to highlight it, and then click **Run Selected Task**. The task name will appear in the task progress bar at the bottom of your screen and will be inserted into the recorded data. When you are ready to change tasks, repeat the above steps, highlighting a new task name. Click the record icon to start recording the task. You can change the task name while recording or you can opt to click the Pause button between tasks.

Running Preset Programmed Tasks

Click on the **Select Task** button in the bottom Session Control Toolbar to bring up the Programmed Task Schedule window.   In the **Select Schedule** drop-down box select a Task Schedule name.

The list of tasks in that schedule will appear in the large task status box. Click on a **task name** in the list and click **Run Selected Task**.
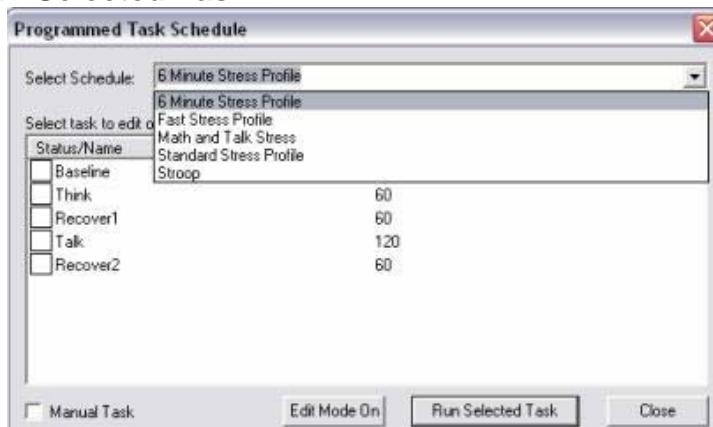
Scheduled tasks are set to either progress on to the next task immediately or to pause before starting the next task. Check marks will appear in the task list next to each task that has been run and recorded in the session. If a preset task stops recording and the green "Pause" status message is flashing, you can opt out of the timed pause by clicking the **Pause ON/OFF** button to immediately run the next task.

- To manually pause while a task is running click the **Pause ON/OFF** button. Re-click the Pause button to the resume the task.

- To stop a task before it is finished and move on to the next task or to skip to a later task, click **Record ON/OFF**, then the Select Task button. Click on the name of the task you wish to run, then click **Run Selected Task.**

- To cancel a task schedule before it is finished and exit the session, click Record **OFF**. Then exit the session using the lower left-hand exit arrow and either save or discard the data.

> When a schedule of tasks finishes running, the final task will remain paused until you click the exit arrow.

You may run each task once per session. To maintain data integrity, the data must then be saved and the session exited before you can run the same tasks again.

Customizing Programmed Tasks

You can create multiple task schedules with unique customized tasks in each.
The easiest way to start is to modify an existing task schedule for your own unique needs.
When you finish modifying tasks as outlined below, be sure and
Click **Update Schedule** to save all of your changes.

To begin, first click on the Task ▦ button, then click **Edit Mode On**.
Click the Select Schedule drop-down box and click on the task schedule name that most closely matches the list of customized tasks you wish to create.
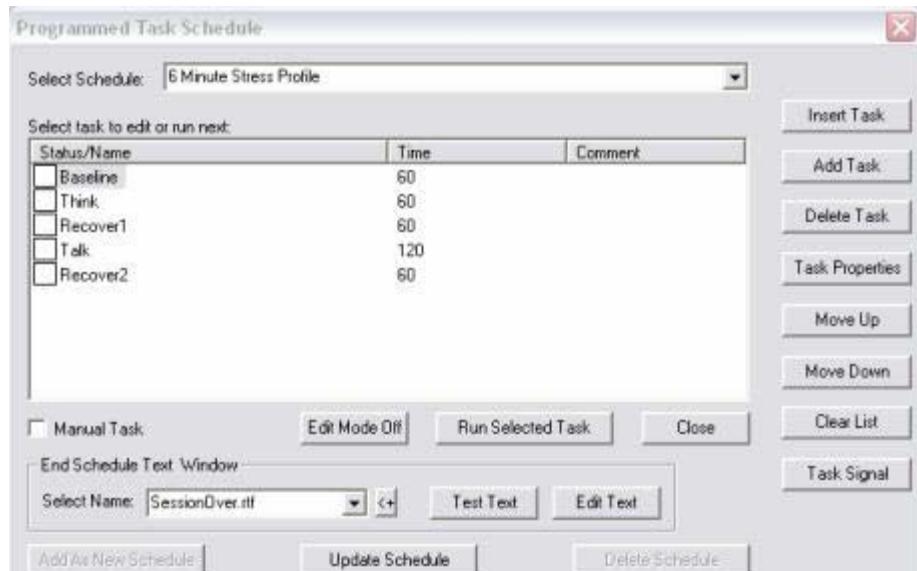
You may move tasks up or down in the list, add new tasks to this list, delete tasks from the list, and modify the remaining tasks. Each task must be customized individually. (If the task you want to modify has already been run during the session the Task Properties button will be grayed out and you must exit the session and re-enter a new session before modifying the task.) Highlight the name of the task you wish to customize, and then click **Task Properties**. Click **Advanced** to expand the window.

In the Task Properties window you can edit the name of a task by simply typing over the existing task name (TIP: This task name may function as an instruction to the client since the task name is displayed at the bottom of the feedback screen). "Category" is an optional sort field not used in the current USE3 View function.
The Start Screen drop-down box should be left at NONE unless you want the program to jump to a pre-selected screen at the beginning of the task.
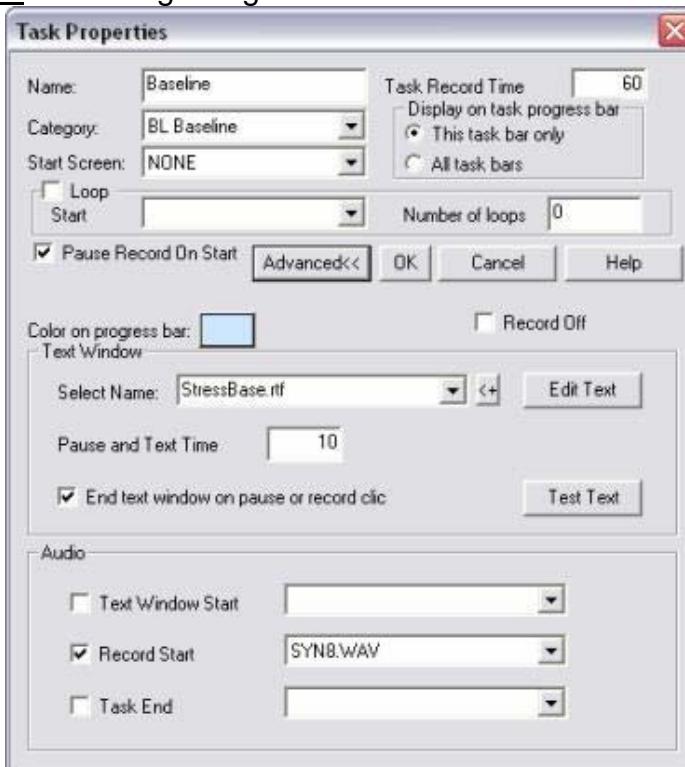
If you do wish to jump to a particular screen, select the screen name in the Start Screen drop-down box. Specify a <u>Task Record Time</u> in seconds. Choose "This task bar only" to display the <u>progress bar</u> for this single task across the entire width of the screen. Choose "All task bars" if you wish the progress bar to show progress through all of the tasks in the task schedule.

You can <u>loop through a single task or through a series of tasks</u> a specified number of times. Check **Loop** then select the name of the task that you wish to have as the start of your loop. You may only loop back to tasks in the list that are above the currently selected task. (NOTE: You will need to click the drop-down arrow and the tiny scrollbars to see all the tasks in the list.)
Type in a **Number of Loops** to indicate the number of times you want the program to loop through the tasks before it moves beyond the loop to the next task in the list.

If **Pause Record on Start** is unchecked, recording will automatically start at the beginning of the task and continue for the number of seconds you specify in the top right **Task Record Time** box.

You may set a <u>pause</u> at the beginning of the task and let the <u>task auto run</u> so that the task begins recording after the time interval that you specify. Check **Pause Record on Start** and specify a number of seconds in the **Pause and Text Time** box in the middle of the window.   If you wish to <u>manually start each task</u>, you will want to specify a long pause time at the beginning of each task. When you run the task, click the **Pause ON/OFF** button to manually override the pause and begin the task.

Programmed Tasks: Instructional Text Boxes

If you wish for a <u>text box with instructions</u> to appear at the beginning of the task, you can select one of the text instruction files in the **Select Name** drop-down box.

- Click **Test Text** to position and resize the window and to view the text. USE3 Physiolab comes with a large selection of instruction text files but, if you wish to add your own, you can create text files and save them into the C:\Program Files\PHYSIOLAB Engineering\Physiolab\Text folder. These files must be in **.rtf** file format and must have unique file names. If you wish to change the wording of J&J's instruction files, click **Edit Text** after selecting the filename that you wish to edit. Be sure to click **Save As** and change the file name so that your customized files will not be overwritten during software updates.

- Check **End text window on pause or record click** if you wish the test instruction window to <u>close when recording begins</u> (either an auto run pause times out or you click Pause ON/OFF to manually override the pause).
- If **End text window on pause or record click** is unchecked the text window will appear during the <u>entire length of the task</u>. **NOTE:** You must click Test Text and resize the window in order for the text to display properly.

If you wish a task to be instructional only, with no data recording, check the **Record Off** box.

Programmed Tasks: Audio Files

USE3 Physiolab comes with many <u>audio files</u> which you may elect to play when the task starts, when recording starts or at the end of the task.

- **Text Window Start** files are alert beeps or verbal instructions up to one minute in length. To play an audio file at the beginning of the task, check Text Window Start and select an audio file name in the drop-down box to the right.
- **Record Start** audio files may be used as alert tones or as stressors (i.e. baby crying) in a stress profile task. To play an audio file at the beginning of recording, check Record Start and choose an audio file name in the drop down list.

- <u>If Pause Record on Start is checked</u>, you may specify both Text Window and Record Start sounds since the text window will appear at the beginning of the task and recording will start later. <u>If Pause Record on Start is unchecked</u>, then the text window will display at the same time that recording starts and only the Text Window Start audio file will be heard.

- **Task End** should be used with care. <u>You may not have both an ending audio file for the current task and a beginning audio file for the following task.</u> If you specify both an ending sound for the current task and a beginning sound for the following task, then the ending sound file will be overridden by the following start task audio file.

The easiest way to become familiar with USE3 Physiolab audio files is to go to the C:\Program Files\PHYSIOLAB Engineering\Physiolab\Sounds folder and double-click on each WAV format audio file to play it. The subfolders are sounds that are used in game feedback screens and are not available as task sounds. You may add your own files to the Sounds folder. They must be WAV format audio files and have unique names so that they will not be overwritten during software upgrades.

Creating Your Own Programmed Tasks

- Start by clicking on the **Select Task icon** to open the Programmed Task Schedule window. Click **Edit Mode On**. Click in the top **Select Schedule** box and type a new unique name for your task. (Naming Tips: This name cannot be edited so choose carefully. If you want a particular Schedule to appear at the top of the list keep in mind that schedule names are arranged alpha-numerically in ascending order.) Click **Add Task**. Then <u>follow the same process for each task as outlined in the section on Customizing Programmed Tasks above</u>. If you wish to add a new task in the middle of the task list, click on an existing task name above which you want the new task to appear. Click **Insert Task** and proceed to create the task in the same manner as for adding a new task.

- After you have specified settings for each task, click **OK** in the middle of the Task Properties window. When you have finished setting up all tasks, click **Add as New Schedule** in the Programmed Task Schedule window to save your settings.

Saving Programmed Tasks

After you finish modifying or creating each task you must click **OK** in the upper portion of the Task Properties box. If you click Cancel or close the window with the X your settings will be lost. If you are finished modifying tasks for an existing task schedule, click **Update Schedule**.

If you are finished adding new tasks to a new Task Schedule, click Add **As New Schedule** at the bottom of the Programmed Task Schedule window.

> **COMMENT:** The settings for Task Schedules will be lost when you upgrade your software since they are part of the updated application. You can keep your current (older) version of the application with your customized tasks by going to the C:\Program Files\PHYSIOLAB Engineering\Physiolab folder and renaming the **.mdb** file for each application you wish to save. These renamed customized applications will be not be updated. When you start USE3 Physiolab and click Run Session, two identical application names will appear in the application list. Find the one with your customized tasks and run that one until you have time to customize your newer version of the software.

We recommend that you print screen captures of Task Properties windows for all of your customized tasks so that you can re-create them in the upgraded software. (Instructions: Open the Task Properties window for each task and click **Alt+Print Screen** on your keyboard, then open **Start> Programs> Accessories > Paint**. In the **Paint program** click **Edit**, then **Paste**. Click **File**, then **Print**.)

TROUBLESHOOTING

Our system is very reliable. Nevertheless, like all biomedical devices, there are many processes that must occur to detect, transduce, filter, and display a signal. Some of the more common issues are listed here:

INSTALLATION PROBLEMS:

"INVALID DATABASE" Error?
Keep this in mind - sometimes a download is corrupted by the transfer process and when you run it, you get an 'invalid database' error.
The soultion? *Download again* - until you get a full set.
VISTA users - if you get this error, the download may be corrupted AND/OR Vista is blocking you. Vista by default is set to block almost everything, because you are not installing as 'administrator.' The Vista Solution is to right-click, and select ' **Install as Administrator**.'

Then disable the User Acconts.
Go to Control Panel -> User Accounts -> Turn On / Off User

SIGNAL PROBLEMS:
EEG/EMG/ECG: *The greatest problem is poor skin preparation.* First check the electrodes alone. Take off the sensors and touch each + and - lead to a Ground. Impedance should drop to near-zero. OK? Then the problem is with the skin: Use a circular motion to rub the site first with an abrasive material, then alcohol, then a dry swab. The skin should look slightly red with local blood flow. Then dab a dot of electrode cream on the site and attach the pre-creamed electrode into place. If you pre-gelled EMG electrodes, put some cream on the electrode and site anyway.

SIGN ON PROBLEMS?
If your computer sometimes has problems signing on, there are 4 reasons:

> 1`. **Low battery.** Battery voltage is 6.5 V max and 4.3 V min.
> 2. **Wrong hardware type**. See RUN SESSION/ Setup/Hardware Type.
> 3. **Competing programs** are knocking out access to the processor - you MUST turn off and remove Internet, Norton, defrag, scanner virus and anti-spyware.
> 4. The fourth reason may be that your Vista operating system is not optimized for 'feedback. You may need to **reinstall PHYSIOLAB Applications as as Administrator,**
> 5. You have a computer that is not optimized for fast signal processing and screen drawing. If you have solved the first two problems, and still can not sign-on, strip everything out of the computer, re-install XP or Vista, delete all anti-virus and internet programs, and reload PHYSIOLAB USE3 Plus.

INTERMITTANT SIGN ON PROBLEMS?
Intermittant problems usually are caused by an intermittent failure in some part of the computer.
If your computer sometimes has problems signing on, try this:.
Turn off and remove Internet, Norton, defrag, scanner virus and anti-spyware.
4. The fourth reason may be that your Vista operating system may have updated and reset some internal Administrator file. Save your old **data.mdb** file and reload the program.
5. You have an old computer. If you have solved the first two problems, and still have sign-on problems your CPU-Video card combo may be failing.
How do the Impedance Bars work? Are they the same in every application?
The impedance bars are set by each application developer and generally 100K for EMG, 200K for ECG, and 10K for EEG is used for the yellow green threshold and about three times that for the red yellow.

DATA MANAGEMENT PROBLEMS:

General Exception Error – see DATA MANAGEMENT-EXCEL TROUBLESHOOTING.

[Installation and Update Instructions](#)

System Requirements
The operating system requirement is Windows XP or later with all Microsoft updates.

- Computer: The minimum hardware requirements are an Intel- or AMD-based processor at a speed of 1.6 Gigahertz, 1 KB or more of RAM and a video card with at least 128 MB RAM.
- Second monitor: In order to use the optional dual monitor mode, you will need to run the software on either a laptop computer or on a desktop computer with a dual head video card.
- We strongly recommend isolating the computer that runs our software. Outside programs for Internet connections, defragmentation, malware sweepers, anti-virus, and even Microsoft's background Vista utilities [Vista restore points run all day in the background and are not detectable on the desktop] have been reported to slow down or interfere with data collection. Users who dedicate a computer to our system and isolate it rarely contact us for software problems.

If you want our recommended computer, we have found that the $360 Asus eee 1000 netbook series running XP on a virtual 1024 x 768 is more than adequate. It runs our most processor intensive 4 channel EEG and EMG intensive programs with no problems.

Recommended Additions:
1. USB-ONLY SPEAKERS:

Most users report no problems with XP or Vista audio. However some users of Vista and a few with XP experience a frustrating sound problem: trying to activate more than one sound together with another sound may disable all sounds! Not only that, but the problem persists until you exit and re-start the computer. This means you have to exit and restart to regain sound control. That's frustrating.
This is a hardware problem, not a bug. Unless you have this problem, this discussion does not apply.

The culprit is a laptop or desktop with a cheap audio card. The cards amplifiers saturate / overload and shut off further input.

- Vista is most sensitive to sound saturation problem because Microsoft switched requirements for sound amplifiers. Our testing also indicates instabilities in Vista itself cause audio problems.
- The solution is to purchase **USB-only speakers**. These speakers disable the native audio driver and run high quality USB audio, even Dolby audio, directly into USB-powered amplifiers.
- Look carefully- these special speakers never have plug-in to the earphone jacks. THEY ONLY HAVE USB CONNECTORS. If yours has a USB and a standard headphone-like jack, do not purchase it! Some speakers use a USB port just to power their speakers, not as sound-boards.
- The USB-only speakers include an internal motherboard audio digital decoder plus an amplifier, hidden in one speaker. The decoder and speakers require a USB port. Do not confuse them with traditional speakers that plug into a stereo phone jack. Those old speakers will not work..
-

2. Add an Extended Monitor and run in 'Dual' or 'extended' screen mode"

You can of course share your screen with clients. Field reports universally confirm that this is a bad idea. Clients are confused and distracted by toolbars and windows icons. If you are in a place where to are forced to use a single screen, try turning all toolbars off [see View drop-down menu]. A better solution is to add a second monitor, and adjust it for the same resolution as your primary monitor, 1024 x 756. Monitors range from 15" for about $120, to VGA projectors covering an entire wall.

HARDWARE LOCATION – CABLE EXTENSIONS:

Keep the Physiological Amplifier at least 3 feet away from electronic equipment, especially laptops, monitors and printers. Florescent fight flicker can cause interference. Do not use USB wired extension cords. We have tested commercial wireless USB 2.0 devices from D-Link and they work well up to about 15 feet. We also have an extension cord from the Amplifier input to the sensor cable. This adds 3 feet, giving you about 6 feet to the sensor. This is good for groups or for movement physiology.

Viewing Session Data and Generating Reports

As a researcher, use view data as a quick way of eyeballing your session results, even if you need to export to Kubios HRV.

The View function gives you the ability to review session data in a graphical environment, replay signals, print screens and generate reports. Follow the instructions for selecting session data under Managing Data section above. Then click **View**.

A screen will pop up. IF THE SCREEN IS MOSTLY BLANK, click anywhere, and a screen graphic will be written. It will NOT be to scale. You must highlight a graph, adjust the screen sweep, and then adjust each signal for the optimal view. The result will look something like this:
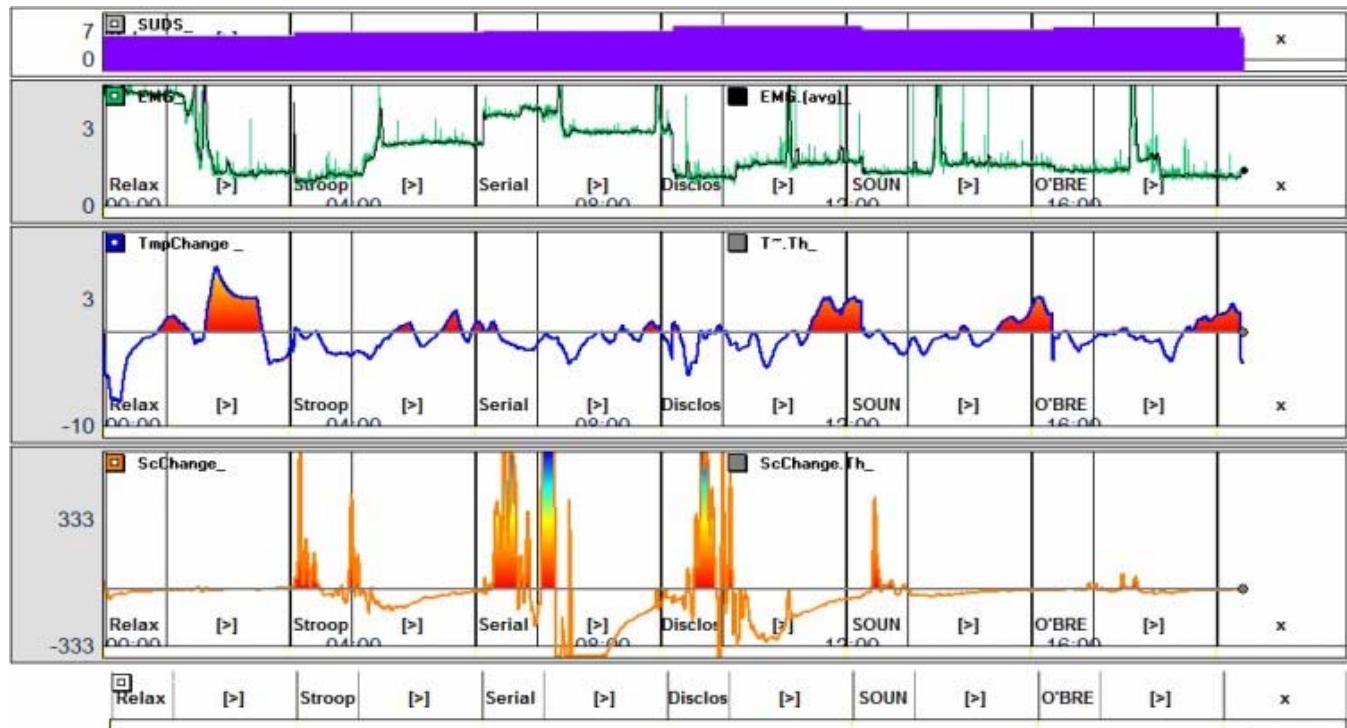
This is a Report generated from View. It is a full stress profile. Originally the signals were not as detailed as they are shown. It was necessary to highlight each graph, and change each signal's view, as explained below.

Changing Signal Views

In the **Session Review Window**, you can replay the session signals, selecting and adjusting the signals using the buttons in the **Signal Control Bar** in the same way as if you were running a session.

If more than one screen selection button is present at the top of the window, you can use them to select the signal grouping that you wish to view.

- If the signals are against the top or bottom of the display area, you must select the signal by clicking on the colored box in front of the signal name, then use the **Signal Up**

or **Signal Down** button ⬇ to manually adjust the height of the signal.   (You must first turn Auto gain and Auto-offset Off.)

- Using the **Faster Graph** button ➡ and **Slower Graph** button ➡ you can change the amount of session time displayed within the window, from focusing on a small segment or single task to condensing an entire session onto one screen.
- Use the **Show/Hide Signals** button ▥ to zero in on just one signal or any combination of signals.

- With the ➕ ➖ **Averaging** buttons in the bottom **Review Session Bar**, you can increase or decrease the smoothing of the signal. Click multiple times until you reach the desired degree of smoothing.
- Use the **Rewind**, **Scroll Forward**, **Scroll Back**, and **End** buttons
    - ⏮ ◀ ▶ ⏭
      To navigate through the recorded session.

- You can hide and re-display:
    - Task Markers with the **Task Mark** button 🔲
    - Event Markers with the **Event Mark** button ⬍
    - Task Bar with the **Task Bar** button ▭ and the
    - Digital Cursor with the **Digital Cursor** button ⬍.

        - When the **Digital Cursor** is toggled on, you can click anywhere in the display to create a vertical cursor line. The signal values at the point where the cursor bisects each signal line are displayed next to the signal names as shown below:

🔲 HR_ 77.3   🔲 HRV30_ 2.3

Printing Screen Images

- When you have adjusted the signal displays as you want them to appear, click the **Print Screen** button 🖨 in the bottom toolbar. Wait a few moments for the screen image to appear.

- Click "Print" in the top menu, modify printer settings as needed, and click OK. You are given the opportunity to abort without printing by selecting "Close" instead of "Print".

Saving Screen Images

- In addition to printing a screen image, you have the option of saving a screen image as a graphics file. Click on the **Save Picture** button 🖫 . In the window that appears, browse to the location where you want to save the image file in the top drop-down box. Give the file a unique filename and click OK.

Printing Quick Reports

You can fine tune your data views by adjusting the signal displays then printing Quick Reports.

- First select a client, an application, and a session as described above in the"Managing Data" section. Manipulate the signals to obtain the screen view to be inserted into your report as outlined above in the "Changing Signal Views" section. Then, to print a pre-formatted Quick Report, click on the **Generate Report** button 📊 button. This brings up the Generate Report window. Accept the defaults or use the checkboxes to designate the types of information to be included. Select a different averaging interval or accept the default. Accept the **Average Only** default or choose **Basic Statistics**. Average only includes mean averages for each signal over the selected interval. Basic Statistics includes standard deviation, minimum and maximum for each interval.
- Click "**Print Quick Report**".

Help?

Want help?
Contact Robert Grove at the address on the first page.