

COVOX System Software is the program that drives the COVOX Metabolic Cart. Standard Microsoft Windows Dialog Boxes give access to the various features.

The views:

Data can be displayed in three distinct ways:

- As a scrolling table.
- As a graph.
- As separate high-visibility data values.

Any two may be visible at the same time.

The table of values usually has a vertical scroll bar that allows the whole table to be inspected. When sampling takes place the table automatically scrolls to show the latest values unless it has been manually scrolled back to show previous data.

The graph usually has a horizontal scroll bar that allows earlier data to be inspected. When sampling takes place the graph automatically scrolls to show the latest values unless it has been manually scrolled back to show earlier data. Up to 6 data values may appear on the graph at any one time. The '**History**' mode can be used to take measurements from the graph. This is described below.

The high-visibility '**Data**' view provides boxes containing the the data values displayed in a large text. This is particularly useful for training. Up to 12 values may be displayed at any one time.

The menu:

The usual Windows menu includes **File**, **Edit**, **View**, **Calibrate** and **Help**.

File:

File>New clears the work area of all data and prepares for the start of a new sampling session.

File>Open allows previously saved data to be recalled for inspection.

File>Save saves the current data under a file name generated from the client's initials and the start time and date.

File>Save as allows the current data to be saved under a different name.

File>Print permits either the table or graph view of the current data to be printed.

File>Import accepts a text or CSV file to construct data from. This is described below.

File>Export save the data in a format suitable for importing into a spreadsheet program.

File>Exit quits the program.

Edit:

Edit opens the editing dialogue box so that certain data may be altered.

View:

View>Table opens or closes the 'Table' view.

View>Graph opens or closes the 'Graph' view.

View>Data opens or closes the 'Data' view.

View>Parameters gives an alternative way of selecting or deselecting the buttons described below.

View Analyser allows you to connect a Douglas bag to the external sampling line for O₂ and CO₂ analysis, ie. the cart can be used as a simple gas analyser.

View Gas Meter allows you to connect a Douglas bag to the inlet port of the cart to enable you to measure the volume of expired air, ie. the cart can be used as a simple gas meter.

The above two views are provided for teaching use, and might be used before allowing the student to graduate to on-line analysis.

View>History enables or disables 'History' mode when a graph is being displayed.

View>Overview compresses the graph view so that the whole test is visible.

Calibrate:

Calibrate not currently available.

Help:

Help>About shows current program version etc.

The buttons:

There are two rows of buttons. The top row consists of only two buttons as the rest of the row is used to display useful information.

The 'Demo.' button starts (and stops) the built-in demonstration feature.

The 'Test' button starts and stops sampling, and is used during the demo.

The second row of buttons is used to select which parameter are to be displayed in the selected view.

They are as follows:

Ev	<i>Event marker</i>
Time	<i>Run time (mm:ss)</i>
VE	<i>Pulmonary ventilation (l/m)</i>
O₂%	<i>Oxygen percentage</i>
VO₂	<i>Aerobic capacity (l/m)</i>
ml/kg	<i>ml Oxygen per kg body weight (ml/kg)</i>
CO₂%	<i>Carbon dioxide percentage</i>
VCO₂	<i>Carbon dioxide production (l/m)</i>
RER	<i>Respiratory exchange ratio [VCO₂/VO₂]</i>
VeO	<i>Ventilatory Equivalent for Oxygen [VE/VO₂] (l/m)</i>
VeC	<i>Ventilatory Equivalent for Carbon dioxide [VE/VCO₂] (l/m)</i>
RR	<i>Respiration rate (1/m)</i>
TV	<i>Tidal Volume (l/m)</i>
HR	<i>Heart Rate (1/m)</i>

Some of these buttons may be greyed out if the readings are not available or 6 lines are already showing on the graph.

Key short-cuts:

The following key combinations may be used:

- Ctrl+A** *Turn all the buttons on and off in bulk.*
- Ctrl+D** *Turn the 'Data' view on and off.*
- Ctrl+E** *Open the edit dialogue box.*
- Ctrl+G** *Turn the 'Graph' view on and off.*
- Ctrl+H** *Turn the 'History' mode on and off.*
- Ctrl+O** *Turn the 'Overview' mode on and off.*
- Ctrl+T** *Turn the 'Table' view on and off.*
- Escape** *Stop sampling.*

Importing data:

Sample data may be fabricated outside the program and imported as a text (.txt) or CSV file.

The file must contain lines of comma separated values. Blank lines are ignored, as is any text following a semicolon, up to the end of the current line.

On a data line, the first two values are VE and O₂%. These must always be present. The third, fourth and fifth values for CO₂%, respiration rate and heart rate may be omitted or zero if not required.

An event marker may be inserted at any point by beginning the line with an asterisk followed by the event marker number in the range 1 to 255, followed by a comma and the rest of the usual data line.

Each line represents one time slice. The size of the time slice is set in the dialogue box on import for either 60, 30 or 15 seconds.

Running the demo:

Clicking on the 'Demo.' button first opens a pre-loaded dialogue box that may be modified to explore different possibilities with the given data. When OK is clicked, a message is given, reminding the user to click on the 'Test' button to start the sampling. When this is done the data values appear every 2 seconds rather than the real amount so that the process may be studied. When all the data have been loaded, the 'Test' button will come out and be greyed. Clicking on the 'Demo.' button again will stop the demo. and clear the views.

Graphs and measurements:

To take measurements from a graph, enable 'History' mode. In this state, when the pointer is moved over the graph view, a pale blue vertical line appears to mark the time. The values for the chosen parameters can be read off for that time in the status bar at the top. If the 'Data' view is also visible, the values will appear in their appropriate boxes.

NB: In ordinary mode, the display works at 1 pixel per second. In 'Overview' mode, once the graph is compressed, the resolution reduces and therefore, measurements will be less accurate.