

## **PolygraphPro Suite Version 4.4.0.0**

### **Global / FrontEnd Enhancements**

#### **Functionality Utility**

The functionality test software has been updated to work with the latest ParagonX hardware.

#### **Dynamic Session Info Window**

The session information window has been upgraded so that it can be resized, the new size will be remembered and next time it is shown it will load in the same size. This upgrade was implemented so that users can fit longer worded labels in the windows and still read them.

#### **ESS report retired**

The ESS report has been retired and is no longer available to view in the software. It has been replaced with the latest version of the ESS-M report. The author recommends only using ESS-M for reporting results.

#### **ESS-M updated the report**

The ESS-M report has been updated to accommodate larger grand totals which previously fell outside of the table ranges. Now any values which fall outside of the available values into tables will automatically round to the closest table value and provide results based on that value. The grand total that is provided on the report will be the actual grand total and not the rounded value.

### **ChartViewer**

#### **New EDA Amplitude channel added**

A new post test channel has been added to the ChartViewer. When you turn on the post test EDA Amplitude channel you will get a new tracing as well as the amplitude measurement stamped on the chart at each question.

Reference "How to - Interpret the EDA Amp Tracing" in the software manual for more details

#### **New Cardio Amplitude channel added**

A new post test channel has been added to the ChartViewer. When you turn on the post test Cardio Amplitude channel you will get a new tracing as well as the amplitude measurement stamped on the chart at each question.

Reference "How to - Interpret the BP Amp Tracing" in the software manual for more details

#### **New EDA Amplitude Threshold Indicators**

With the addition of our new post test calculated EDA Amplitude channel we have also added some optional features for stamping threshold indicators directly onto your charts.

The EDA Amplitude Tool is used to interpret Automatica EDA data collected during your polygraph examination. The addition of threshold indicators helps examiners during their scoring process by quickly calculating the difference between two questions and displaying the result.

Reference “How to - Use and Interpret the EDA Amplitude Threshold Indicators” in the software manual for more details

### **New Cardio Amplitude Threshold Indicators**

With the addition of our new post test calculated Cardio Amplitude channel we have also added some optional features for stamping threshold indicators directly onto your charts.

The Cardio Amplitude Tool is used to interpret Cardio data collected during your polygraph examination. The addition of threshold indicators helps examiners during their scoring process by quickly calculating the difference between two questions and displaying the result.

Reference “How to - Use and Interpret the Cardio Amplitude Threshold Indicators” in the software manual for more details

## **ChartRecorder**

### **ParagonX compatibility**

The ChartRecorder data acquisition has been improved to allow it to collect data directly from the ParagonX. The ParagonX samples at 625 samples per second per channel.

### **Multi Threaded Acquisition Model**

Previously the ChartRecorder had a single acquisition loop for collecting data for the DataPac, Paragon, and MMS. This thread has been split out into four separate threads which can all communicate to one another. This allows for faster data collection as each thread reads from its specific hardware, DataPac, Paragon, ParagonX, or MMS.

## **PolygraphPro Suite Version 4.3.0.14**

### **Global / FrontEnd Enhancements**

#### **Newest Visual Studio Libraries Added**

The entire Polygraph Professional Suite solution has been added and updated to use the latest version of Microsoft's Visual Studio. This ensures that our software is compatible with the latest releases and updates to the Windows operating system.

#### **Updated to DOTNET 4.8**

The entire Polygraph Professional Suite solution has been updated to use the latest version of Microsoft's DOT NET, version 4.8. This ensures that our software is current and is utilizing the latest features available through the operating system, as well as using the most secure features available.

#### **ASIT Update**

The Academy for Scientific Investigative Training (ASIT) algorithm has been updated with the latest release from the author, Nate Gordon.

#### **Finger Print Scanner**

The digital persona fingerprint dependencies have been reintroduced into the installation package, meaning that if you use any finger print scanner that utilizes the digital persona API it will automatically work within the software.

#### **File Regeneration**

Previous versions of the software would regenerate files that were removed from the My PolygraphPro folder. For example, example document templates, questions sets, etc. These are now not automatically regenerated. Meaning that if you remove an example template from the software because you don't want to use it, it will not automatically reappear. You can regenerate them manually using features located under the Advanced Diagnostics section of the software.

#### **Language Switching**

In some situations switching the software from english to another language and then trying to switch back to english would not work. This was dependent on the native language of your operating system. This uncommon occurrence has been resolved and switching back to english from any language works every time now.

### **ChartViewer**

#### **Caliper Box Improvement**

Previously dragging the edges of a caliper box could sometimes cause a lag and make the adjustment delay or

become hard to precisely place. This issue has been resolved and even with slower CPU speed caliper repositioning is now seamless and precise.

### **Export Scientific Measures**

A new export feature has been added to the ChartViewer. Choosing Options from the menu and then Export Scientific Measures will produce one export file per chart and place them within a folder of the same name directly under the session folder. The scientific measures export produces precise measures at set intervals for each question within your chart. A detailed description of the measure is included with the export files.

### **ESS/ESS-M Input sheet**

The input or scoring sheet for the ESS and ESS-M algorithm has been updated. The input sheet is much more visually appealing and has drop downs that quickly display to help you get scoring faster.

### **OSS3 loading**

The OSS3 report sheet has been updated to accommodate more input formats and better handle any unexpected text. This has eliminated most possibilities that could cause OSS3 to not load properly or to load slowly.

### **Caliper Precision**

The hand calipers, box calipers, and instantaneous measures have all been upgraded to include 4 decimal place precision, as well as any time references for measures.

### **Caliper Measures**

A new measurement has been added to all of the calipers. Microsiemens. This measure will give you the microsiemens at any one point in time if using the instantaneous measures, and the differential in microsiemens from the highest value to the previous lowest value with the scoring window.

### **Caliper Enhancement**

*Show Horizontal Caliper:* Previously the show horizontal caliper feature needed to be turned on each time that you used it. That feature now has memory, if you turn it on it will remain on until you turn it off.

### **Caliper Addition**

*Auto Snap:* If you check the autosnap box while using the calipers your chart will auto snap (automatically scroll) to the question that you've clicked on and line it up with the time reference bar.

### **Export PDD**

The values that are exported now take into account that an examiner could be using +/- as responses and automatically converts them to yes/no text so that the responses show in the exported data.

### **File size reduction**

Previously the ChartViewer would save a second copy of your chart data if you made any changes at all, including sensitivity changes, adding notes, etc. The software now does a differential change file and only writes out data that

has changed to the secondary file. This typically results in a file size reduction of half for most examiners.

## **ChartRecorder**

### **Multithreading**

The data acquisition portion of the ChartRecorder has been improved to use multithreading for each device that could be connected. Each device (Paragon, DataPac, and MMS) has its own thread allowing them to work independently from one another and acquire data quickly and more efficiently.

### **Sensitivity adjustments**

Now when you hover your mouse over a channel button (right of chart) and scroll the centre mouse wheel, the tracing will zoom in or out respectively for that channel. It allows for quick easy adjustments while recording or setting up your tracings

### **AUX 1 Channel filtering**

AUX 1 is used for a secondary piezo input. Now the pgaug noise reduction filter is also applied to that channel. This allows examiners to adjust filtering on those channels to reduce noise based on their particular needs.

### **Right margin gap - It's back!**

In our last public release 4.3.0.4 we inadvertently removed a long standing feature, the right margin gap. This is the 2 second blank section on the right hand portion of your chart. It has been a visual representation since the inception of our first version of software and has been re-introduced.

### **Auto sequencing now optional**

In version 4.3.0.4 we introduced an enhancement that automatically switched from one question set to the next after you completed all of the sequences within that question set. Some examiners had requested that we make that optional so that they could choose when the question set advances. This feature is now optional, by default it is turned on, if you do not want to use it just uncheck the option.

### **Print last**

The print last feature has been updated and can be used to print the last chart that was run from directly within the ChartRecorder

## PolygraphPro Suite Version 4.3.0.4

### ChartViewer

#### All new post test channels

Three new post test calculated channels have been added in the ChartViewer. VR, RE1, and RE2.

- **VR** - The Vasomotor Reaction tracing is used to interpret PLE cardio data. The V.R. value will be stamped at each question point aligned with the V.R. channel while it is displayed on the screen. Lower values will show a higher line on the chart so that examiners can quickly compare which question had a stronger reaction based on the value as well as the actual V.R. tracing.
- **RE1 and RE2** - The Respiratory Excursion Tool is used to interpret Pneumatic data collected during your polygraph examination. The excursion value will be stamped at each question point aligned with the RE1 and RE2 tracings. Lower values will show a higher line on the chart so that examiners can quickly compare which question had a stronger reaction based on the value as well as the actual tracing.

New How To documents have been written to describe “How to - Interpret the Vasomotor Ratio Tracing” as well as “How to - Interpret the Respiratory Excursion Tracing(s)”.

#### VR, RE1, and RE2 Threshold Indicators

With the addition of our new post test calculated channels we have also added some optional features for stamping threshold indicators directly onto your charts.

- **VR** - The Vasomotor Ratio Tool is used to interpret PLE cardio data collected during your polygraph examination. The addition of threshold indicators helps examiners during their scoring process by quickly calculating the difference between two questions and displaying the result.
- **RE1 and RE2** - The Respiratory Excursion Tool is used to interpret Pneumatic data collected during your polygraph examination. The addition of threshold indicators helps examiners during their scoring process by quickly calculating the difference between two questions and displaying the result.

New “How To” documents have been written to describe “How To - Use and Interpret the Vasomotor Ratio Threshold Indicators” as well as “How To - Use and Interpret the Respiratory Excursion Threshold Indicators”.

### ChartRecorder

#### Tracing centering arrows

A new option has been added into the Chart Visual Option sheet which allows you to specify the color of your centering arrows. You can choose any color you like.

#### Instantaneous Measurement Markings

A new option sheet has been added into the ChartRecorder Options group, named “Measurement Markings”. You can now choose to stamp values from any of the instantaneous gauges on the left of your chart, either on each X and XX question or all questions.

### Global / FrontEnd Enhancements

### **Document Storage**

All algorithm reports are now stored in your documents folder. This allows you to easily review them from your FrontEnd. Just click the documents drop down on the left of the screen when you have the session highlighted.

### **Unicode Compliance**

Version 4.2 limited some unicode characters in very limited situations (the exam file name for example). Version 4.2.0.10 has now been brought back up to being fully unicode compliant in all aspects and input fields.

### **ASIT Upgrade**

ASIT has been updated to the latest version. The latest version includes reporting with P Values among other new features.

## PolygraphPro Suite Version 4.2.0.10

### ChartViewer

#### All new post test channels

Three new post test calculated channels have been added in the ChartViewer. VR, RE1, and RE2.

- **VR** - The Vasomotor Reaction tracing is used to interpret PLE cardio data. The V.R. value will be stamped at each question point aligned with the V.R. channel while it is displayed on the screen. Lower values will show a higher line on the chart so that examiners can quickly compare which question had a stronger reaction based on the value as well as the actual V.R. tracing.
- **RE1 and RE2** - The Respiratory Excursion Tool is used to interpret Pneumatic data collected during your polygraph examination. The excursion value will be stamped at each question point aligned with the RE1 and RE2 tracings. Lower values will show a higher line on the chart so that examiners can quickly compare which question had a stronger reaction based on the value as well as the actual tracing.

New How To documents have been written to describe “How to - Interpret the Vasomotor Ratio Tracing” as well as “How to - Interpret the Respiratory Excursion Tracing(s)”.

#### VR, RE1, and RE2 Threshold Indicators

With the addition of our new post test calculated channels we have also added some optional features for stamping threshold indicators directly onto your charts.

- **VR** - The Vasomotor Ratio Tool is used to interpret PLE cardio data collected during your polygraph examination. The addition of threshold indicators helps examiners during their scoring process by quickly calculating the difference between two questions and displaying the result.
- **RE1 and RE2** - The Respiratory Excursion Tool is used to interpret Pneumatic data collected during your polygraph examination. The addition of threshold indicators helps examiners during their scoring process by quickly calculating the difference between two questions and displaying the result.

New “How To” documents have been written to describe “How To - Use and Interpret the Vasomotor Ratio Threshold Indicators” as well as “How To - Use and Interpret the Respiratory Excursion Threshold Indicators”.

### ChartRecorder

#### Tracing centering arrows

A new option has been added into the Chart Visual Option sheet which allows you to specify the color of your centering arrows. You can choose any color you like.

#### Instantaneous Measurement Markings

A new option sheet has been added into the ChartRecorder Options group, named “Measurement Markings”. You can now choose to stamp values from any of the instantaneous gauges on the left of your chart, either on each X and XX question or all questions.

### Global / FrontEnd Enhancements



### **Document Storage**

All algorithm reports are now stored in your documents folder. This allow you to easily review them from your FrontEnd. Just click the documents drop down on the left of the screen when you have the session highlighted.

### **Unicode Compliance**

Version 4.2 limited some unicode characters in very limited situations (the exam file name for example). Version 4.2.0.10 has now been brought back up to being fully unicode compliant in all aspects and input fields.

### **ASIT Upgrade**

ASIT has been updated to the latest version. The latest version includes reporting with P Values among other new features.

## **PolygraphPro Suite Version 4.2.0.0**

### **Global / FrontEnd Enhancements**

#### **Newest Visual Studio Libraries Added**

The entire Polygraph Professional Suite solution has been added and updated to use the latest version of Microsoft's Visual Studio. This ensures that our software is compatible with the latest releases and updates to the Windows operating system.

#### **Generate Report**

Version 4.2 now comes loaded with newly updated report templates and customizable score sheets.

#### **Language addition**

Hebrew has been added as a fully supported live switching language within our Polygraph Professional Suite.

#### **ASIT Update**

The ASIT scoring algorithm has been updated to the authors latest standards. Visual enhancements have been added along with some small calculation changes.

#### **Question Viewing Area**

The question viewing area in the ChartRecorder and ChartViewer has been enlarged and the default font made slightly smaller. This allows examiners to have longer questions 100% viewable in the window.

#### **Archiving Utility**

Several enhancements have been added to the archiving utility.

1. You can now choose to split zipped files up into multi part archives, including the size of the parts. This allows you to send large files including video via email.
2. You can now also choose to password protect zip files, they are protected with AES-256 encryption which is the highest available encryption for a zip file.

#### **MultiVideo**

The MultiVideo window has received an all new facelift and feature set.

- Microphone amplitude change is shown and recorded for playback afterwards directly into your video. This way you can see when an examiner begins speaking for even closer post test QC.
- Question Labels are marked and recorded within the video showing exactly when the examiner pushed the space bar and let go of it. The question label is coloured to reflect the question type and dims after the examiner has let go of the space bar. The exam and chart numbers are also denoted within the video. This makes review of the video much easier and understandable for QC as well as non polygraph professional who may review the video.

## ESS Additions

ESS has been updated to allow the submission of PLE scores, these scores are added to the totals and calculated within the ESS score sheet.

## Updated manual

You can find our newly updated PDF manual under your help menu within the software.

## ChartRecorder

### Optionally increased sampling rates (Paragon)

Now in the ChartRecorder if you have a Paragon connected you will have the option to sample at 40, 80, 150, 240, 320, 400, 480, 560 samples per second. The original sampling rate of 80 samples per second is the default option selected.

### Auto Question Set Advancing

Now in the ChartRecorder when you finish asking all of the sequences within a question set the software will automatically advance you to the next question set. You still have the ability to manually choose between any of your available question sets as well.

### Auto Centering

Newly added to the ChartViewer as an option you can now auto center all of your tracings before each questions (without the center arrow).

### Question timer enhancement

You can now choose to have your question timer begin to count after you have finished your question to guarantee a desired minimum amount of time between your question offset and the next question onset.

### More session details

Now on your chart you will notice the serial number of the instrument that was used to record the chart. You will also get a timestamp for when the chart was ended.

### Room temperature

An option has been added to stamp the room temperature at the beginning and end of each chart recorded (requires room temperature sensor / transducer).

## ChartViewer

### Vasomotor Response Calculations and Tracings

New post test channels have been added which can be used to easily see the Vasomotor Reactions directly on your chart.

### Customizable Scratch Pad

The latest version of our scratch pad allows you to click the "customize" button and then totally redesign the built in scoring sheet

however you would like. Customize your scratch pad directly in Excel using all of the features within and then the ChartViewer will automatically load it up and manage it for you while scoring.

### **Hand Calipers improvements, including more precision**

The hand calipers have been improved to include memory for their time span, the caliper data is now saved along with the chart meaning that when you pull them up they are where you left them the last time you were using that on any particular chart. The hand calipers within the ChartViewer have also been improved to display measurement accuracy to two decimal places for the horizontal and three for the vertical measurements.

### **Chart Biometrics**

You can now add examinee images to your chart along with fingerprints. These examinee images are larger and of much higher quality. Not only can you add examinee photos to each chart, you now have the ability to choose which photo if you have taken several photos of your examinee, just right click and "Select Examinee Photo".

### **Chart Inclusion / Exclusion**

You can now right click on any chart tab at the top of your currently selected chart and choose to include or exclude it from the scoring window. By default all charts are included, if you choose to exclude a chart then the scoring algorithms will ignore them when calculating their measurements.

### **Response window markers**

The ChartViewer now has a post test analysis option to add response window markers. You can choose to denote these 5 seconds from the stimulus offset of 5 seconds from the examinee response marker.

### **Fast switching improved**

In previous releases of the version 4 series of Polygraph Professional Suite it was occasionally possible for charts to appear as doubled up if you switched very quickly between chart tabs in the ChartViewer, this fast switching has been improved to not reflect this.

## **QuestionEditor+**

### **Copy & Paste**

The QuestionEditor+ has been improved to now include right click context menus for whole questions and not just the question text. You can cut, copy, and paste whole questions within your exam. The cut, copy, paste feature works across multiple copies of the QuestionEditor+ which means you can open up a previous question set and copy and paste back and forth saving you time while creating new question sets.

## PolygraphPro Suite Version 4.0

### Global Enhancements

#### MultiVideo

The MultiVideo application now has an integrated sound meter which allows the examiner to choose their microphone and perform a sound test prior to recording for optimal audio. We have also included a feature that allows examiners to start the MultiVideo application in *Preview Only* mode. This can be useful if the examiner wishes to view the examinee or examination room from another camera angle without having to record this view with their session.

#### Improved Report Generation

Limestone clients can save more time than ever with our redesigned Report Generator. This Polygraph Pro application is now 50 times faster with convenient Office 2016 and Office 365 integration.

### Redesigned ChartRecorder

#### Comfortable New look

The ChartRecorder has been totally rewritten from the ground up in the latest .NET framework. This ensures our continued compatibility with operating systems moving forward and allows us to utilize the latest techniques available for software development. You will find the ChartRecorder although totally rewritten has the same comfortable look and feel that you're used to if you're an existing user. If you're a new or potential user you should find the easy to use and streamlined operation a welcomed change compared to our competitors software.

#### Changes in look and feel

The toolbar has been moved to the top of the chart and allows the user to hide and show it if they wish. This has freed up room to the left of the chart to allow space for some of our new real time meters (Described more under New Features)

#### New Features

The ChartRecorder has seen some additions and changes throughout the new development.

- You will find real time meters to the left of your live charts for: K Ohms, BP (Blood Pressure), Beats Per Minute (BPM), Temperature (Room / Skin), and O2 (Oxygen Saturation).
- We have also added the ability to record any channel that you wish without showing it on the chart.
- The PGauge (Standard Seat Cushion) can now be combined with the MMS All channel, this allows examiners who are taking advantage of the Movement Monitoring System (MMS) to truly combine all movement sensors into one tracing regardless of which instrument they are plugged into.
- There is a distinctly new status box above the chart which indicates clearly what mode the ChartRecorder is in and which hardware devices are attached. For example it could state: "Simulation Mode", "DataPac", "Paragon + MMS", and so on. With a quick glance you can tell which mode you are operating in. Along with this status box we have implemented the ability to plug/unplug any and all of your devices in on the fly, if it says "Simulations Mode", just plug in your hardware and the status will change to "DataPac" / "Paragon" and so on, your data will automatically adjust to the current input, switching from simulation to real.
- You will notice a new button on the toolbar labelled "Auto Tracking", if you enable auto tracking the chart will attempt to

keep all of the tracings nice and clean and on your chart for you, by centering real time and automatically adjusting the sensitivity for each visible channel.

## Redesigned ChartViewer

### Comfortable New look

The newly rewritten ChartViewer purposely mimics the same clean and intuitive look and feel of the ChartRecorder. This helps the user easily navigate and work without any major change in design and layout. As with the ChartRecorder the ChartViewer has been totally re-written from the ground up in the latest .NET framework. This ensures our continued compatibility with operating systems moving forward and allows us to utilize the latest techniques available for software development. You will find the ChartViewer although totally rewritten has the same comfortable look and feel that you're used to if you're an existing user. If you're a new or potential user you should find the easy to use and streamlined operation a welcomed change compared to our competitors software.

### Faster loading times

The ChartViewer now loads charts up to 20 times faster, this allows for fast seamless switching between charts during review and scoring

### Faster Autoscoreing

The measuring time has also been drastically decreased while using the calipers and scoring algorithms as a result of faster loading times. This also results in a much faster autoscore process while scoring OSS3.

## Redesigned ChartStacker

### Comfortable New look

The newly rewritten ChartStacker also incorporates and takes advantage of the latest .NET framework. You will notice that the ChartStacker loads and reacts much quicker than any previous versions, while still accomplishing all of the same seamless tasks.

## New Measuring Features

**We have seen increased interest in looking at the data using a variety of measuring options. Below is a summary of our built-in measurement options for version 4.0**

### Vasomotor Reaction Ratio Tool

We compare the Mean Amplitude within the second five second duration period after question onset to the Mean Amplitude within the three second window collected pre- stimulus onset (start of question onset).

The result is the degree of suppression (if any) between the pre-stimulus average and the five second degree of suppression (if any) expressed as 1 being no difference and less than 1 being the ratio of suppression or increase (1. something, 1.1, 1.2, etc)

## Improved Measurement Options (Caliper Windows)

Measurements are taken within a sample window, indicated on the chart as a resizable rectangle. The horizontal dimension of the rectangle (caliper) determines the start and finish time of the sample. The vertical dimension of the rectangle (caliper) is used to 'clip' or limit the waveform should artifacts exist in the sample.

### Amplitude

The distance in inches or centimeters between the maximum and minimum values within the sample window.

### EDA Amplitude

The distance in inches or centimeters between the maximum value in the sample window and the first value in the sample window.

### Cardio (Diastolic) Amplitude

The cardio analysis module is used to perform this measurement. This measurement is the distance in inches or centimeters between the diastolic minimum and diastolic maximum.

### Line Length (Y)

Calculates the sum of the vertical changes in the waveform contained within the sample window.

### Cycles

Calculates the number of cycles within the sample window. See 'The Cycle Measurement' section for more details.

### Frequency (CPM)

Uses the cycles measurement to determine the number of cycles in the sample window and converts that value to cycles per minute.

### Inches

Measures the height of the caliper rectangle in inches. You can take a direct vertical measurement by placing the top and bottom of the caliper box on the points to be measured.

### Centimeters

Measures the height of the caliper rectangle in centimeters. See the 'Inches' measurement for more details.

### Line Length (H)

Moves along the waveform in increments calculating delta X and delta Y. These values are used to calculate the hypotenuse of a right angled triangle. The hypotenuse represents the distance travelled along the waveform.

### **Cardio (Systolic) Amplitude**

The cardio analysis module is used to perform this measurement. This measurement is the distance in inches or centimeters between the systolic maximum and minimum within the sample window.

### **Cardio (Systolic) Mean BP**

Calculates the mean systolic value and performs an internal conversion to give a readout in millimeters of mercury (mmHg) representing the mean systolic blood pressure.

### **Cardio (Diastolic) Mean BP**

Calculates the mean diastolic value and performs an internal conversion to give a readout in millimeters of mercury (mmHg) representing the mean diastolic blood pressure.

### **Microsiemens**

Is a measure of electrical conductance between the EDA leads. The reading is taken at the left (or left hand side) of the measurement calipers and represents the instantaneous value at that point.

### **ASIT Cardio (Diastolic) Amplitude**

The cardio analysis module is used to perform this measurement. The first diastolic tip or peak of the first full cycle is located and that point is used as a horizontal reference within the measurement window. The distances between the line and the diastolic minimum and diastolic maximum are calculated. The larger of the two numbers is taken as the result. If the result is negative blood pressure is decreasing within the sample window and if the result is positive the blood pressure is increasing within the sample window.

### **% Oxygen**

The percentage of oxygen saturation refers to the portion of oxygen-saturated hemoglobin relative to total hemoglobin in the blood. The data is collected using the Nonin photoplethysmograph. The reading is taken at the left (or left hand side) of the measurement calipers and represents the instantaneous value at that point.

### **Cardio Analysis Module**

The cardio analysis module in Polygraph Professional Suite is designed to count cycles and perform systolic and diastolic measurements with a high degree of accuracy. The techniques used are highly tolerant of signal noise and drift due to changes in the subject's blood pressure.

This module is capable of, but not limited to, performing the following calculations:

- Cycles (to a fraction of a cycle)
- Systolic and Diastolic Amplitude



- Systolic and Diastolic Minimum, Mean and Maximum
- Mean Blood Pressure (systolic or diastolic)

### **Systolic Measurement**

The cardio analysis module identifies the systolic tips or peaks of the waveform within the sample window and uses those values to take measurements. For example, systolic amplitude can be calculated by locating the minimum and maximum systolic values and calculating the difference.

### **Diastolic Measurement**

The diastolic measurements are calculated in the same manner as the systolic measurements, but instead use the diastolic tips or peaks of the waveform.

### **The Cycle Measurement**

The cycle measurement uses historical data within the sample window to establish a mean cycle time. Whole cycles are measured directly from the data while partial cycles are pro-rated against the mean cycle time. These two values are combined to produce the final result.