



BY **cority**

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# A Detailed Analysis of RSIGuard's DataLogger Functionality

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## Table of Contents

<b>Introduction .....</b>	<b>3</b>
<b>Establishing the Need for Data Collection .....</b>	<b>3</b>
<b>What kinds of data does RSIGuard collect? .....</b>	<b>5</b>
<b>A Technical Discussion of the Data Collected.....</b>	<b>7</b>
<b>Daily Statistics .....</b>	<b>7</b>
<b>Overall work intensity statistics .....</b>	<b>15</b>
<b>Keyboard Analysis Tool statistics .....</b>	<b>15</b>
<b>Privacy and Security Issues.....</b>	<b>17</b>
<b>Options for Accessing DataLogger Data .....</b>	<b>18</b>
<b>Extended DataLogger Tools.....</b>	<b>18</b>
<b>Future Research Plans .....</b>	<b>21</b>
<b>Appendix 1 – Description of UserInsight Export Fields.....</b>	<b>22</b>
<b>Appendix 2 – RSIGuard Fields Key.....</b>	<b>25</b>
<b>Appendix 3 – Key to RSIGuard Settings Transmission to OES .....</b>	<b>31</b>

## Introduction

This document discusses in detail the principles behind RSIGuard's DataLogger feature. Other basic documentation on DataLogger can be found separately at <http://www.rsiguard.net/help/helpdlrr.htm>. Detailed analysis of the BreakTimer feature can be found at <http://www.rsiguard.com/documents/help/BreakTimerAnalysis.pdf>.

## Establishing the Need for Data Collection

Data about how people work at their computers can be helpful in determining the work patterns that contribute to repetitive strain injuries (RSIs) or other computer-related injuries (CRIs). Understanding the causes of RSIs can highlight which solutions are most likely to help an RSI sufferer as well as give guidance in how best to prevent future injuries.

DataLogger collects useful information about how people work at their computers to:

1. help establish baselines before injuries that may indicate causative factors leading to discomfort or injury
2. quantitatively measure changes that occur as a result of macro changes in the job environment, and
3. identify changes resulting from discomfort or injuries.

Understanding this information about an individual allows an ergonomist to identify the solutions that will provide the individual user the greatest benefit. Understanding this information for an organization allows an environmental health & safety manager to identify the types of problems that most frequently occur, identify individuals who are most likely to have such problems, and to identify systemic and individual solutions to prevent injuries before they occur.

Here are four examples of how RSIGuard data can be used:

1. Determining patterns that lead to high incidence of injuries (using the aggregate reporting functionality of the GroupInsight application (RSIGuard standalone) or the OES (for OES administrators)) and focusing corrective measures toward healthy individuals who fit the pattern of having a higher risk of future injury.
2. Increasing the effectiveness of ergonomic evaluations by rapidly giving an evaluator insight into how the subject uses the computer both in terms of behavior (e.g. break taking patterns), exposure to repetitive strain (e.g. keypresses, mouseclicks), and exposure to static strains (e.g. time spent using the mouse and keyboard).
3. Providing health-care professionals with objective data upon which to base prescriptive corrections such as work restrictions and job modifications.

4. Increasing the ability of the employer, employee, and insurance company to maintain (or prove) levels of exposure and compliance with workers' compensation-related work restrictions and to provide pre and post injury insight into the actual causes of injury.

Lets look at an illustrative example.

An employee reports that he is having discomfort in his right arm at the end of the work day. An ergonomic evaluation, including looking at DataLogger data (using the UserInsight application), shows quickly that he uses the mouse intensely; the evaluator finds that by bringing the mouse closer and using RSIGuard's AutoClick feature, the employee can nearly eliminate the discomfort.

However, because the employee waited a long time to report the injury, these corrections do not completely resolve the symptoms, and the employee visits a physician.

At some point in the employee's care, the physician wishes to prescribe a reduction in computer use. The employee uses UserInsight to print graphs of his computer usage, giving the physician accurate historical baseline information about the employee's workload. The duration and intensity of both mouse and keyboard use, as well as break-taking patterns – today, last week, last year, etc. – are all accessible. Instead of being dependent on an inaccurate self-assessment, the physician can determine a reasonable reduction based on the actual exposure that led to injury.

The employee uses the Work Restriction feature of RSIGuard so that he and his employer can be confident that he knows how to abide by the work restriction prescription. But, being obsessive, the employee in this example has trouble following the restriction. However, the employer uses GroupInsight to create a report of employees who are not following their restrictions and is able to identify this employee as needing additional intervention before the problem worsens.

Recognizing that this employee's exposure levels are above average, and that other employees with similar exposure levels have developed similar injuries, a policy is instituted that employees with such high levels of mouse usage all receive an evaluation of mouse placement, training in AutoClick, and training in keyboard shortcuts/KeyControl.

How much exposure to strain is too much? What are high levels of usage? The UserInsight application uses color coded graphs to make it easy to see when an employee is in a risky category, and specifically what needs to change to lessen that risk. Using GroupInsight, you can also search for employees in risky categories, and learn what is above or below average for your organization.

## What kinds of data does RSiGuard collect?

RSiGuard's DataLogger collects information about how the user is working both in terms of intensity and time. It also collects behavioral information about how the user interacts with the BreakTimer system.

Work-time statistics recorded daily include:

- Date data was recorded.
- Start and end times of computer work.
- Amount of time the keyboard was in use.
- Amount of time the mouse was in use.
- Amount of time that the user was using computer.
- Amount of time that the user rested.

Break-related statistics recorded daily include:

- Number of suggested breaks and microbreaks that were taken vs skipped.
- BreakTimer and Microbreak compliance.
- Work Restriction compliance.
- Total time spent taking BreakTimer-suggested breaks.
- How much the user postponed taking breaks.
- Number of natural rests the user took.
- "Average break length" setting and "average time between breaks" setting.
- "ForgetMeNot interval" setting and "Microbreak length" setting.
- Stretch feature usage compliance.
- Number of stretch suggestions the user was given.
- "BreakTimer willpower" setting.
- Work Restriction length setting (or a dynamic value if dynamic restrictions are active).

Keyboard and mouse-related statistics recorded daily include:

- Amount of cumulative strain incurred from using the keyboard.
- Amount of cumulative strain incurred from using the mouse.
- Total number of keystrokes.
- Total number of mouse clicks.
- Average keypress force intensity.
- Total number of times user switched between keyboard & mouse.
- Number of mouse left clicks, middle clicks, and right clicks.
- Distance mouse traveled.
- Number of mouse double clicks.
- Number of manual mouse drag & drops.
- Number of KeyControl assisted drag & drops.
- AutoClick usage compliance.
- Number of AutoClicks.

- KeyControl re-mapping feature usage compliance.
- Number of KeyControl hotkeys used.
- Fatigue estimate based on the total number of keyboard errors (i.e. Backspace/Delete usage).
- Hand posture estimate based on type of typing (i.e. textual vs. non text).

Information recorded as a running average includes:

- Average overall keystroke intensity.
- Average overall intensity of keyboard use.
- Average overall intensity of mouse use.

Information recorded as a running average about the keyboard includes:

- How many times each key is used relative to total number of keystrokes.
- A measure of keystroke intensity for each key on the keyboard.
- How long it takes the user to reach each key.

Finally, information provided in a Health Status Report (a subjective self-assessment available in RSIGuard standalone (non-OES) installations) includes:

- Name and identification.
- Reason for filing report.
- Current pain level.
- Normal/typical pain level.
- Frequency of symptoms.
- Current medical care.
- Use of anti-inflammatories, wrist-braces, & painkillers.
- Location on body of symptoms (via checkboxes on a front/back image of body).
- Additional symptom and general comment information.
- Up to 4 custom yes/no questions.

## A Technical Discussion of the Data Collected

The descriptions below provide information about each DataLogger-collected statistic. Each statistic has a general description of its purpose (in italics) followed by a technical description that gives a precise descriptions of the manner in which the data is being collected.

### Daily Statistics

*The following work-time statistics are recorded daily:*

**Date** – *This statistic indicates the date associated with each set of recorded daily statistics.* The date stored is the date of the system clock in the selected time zone selected in Microsoft Windows on the computer on which the executable RSIGuard.exe is executing. RSIGuard stores all daily data to the user's disk drive when: (1) RSIGuard detects a new day has begun; (2) a period of time has passed without caching the information to disk; (3) UserInsight is launched from within RSIGuard; and (4) RSIGuard exits normally.

**Keyboard use time** – *This statistic indicates how much time a user spends using the keyboard and is a strong indicator of the degree of static exposure to keyboard-related postures.* "Keyboard use" time is calculated by noting the time when a first keystroke occurs, and noting when 30 seconds have passed without a single keystroke. During this time, RSIGuard considers the user to be in the "keyboard-active state". The length of time the user is in the "keyboard-active state" is added to the "keyboard use time" accumulator.

**Mouse use time** – *This statistic indicates how much time a user spends using the mouse and is a strong indicator of the degree of static exposure to mouse-related postures (considered by many ergonomists to be a key indicator of risk).* "Mouse use" time is calculated by noting the time when mouse activity (moves, clicks or wheel-spins) first occurs, and noting when 30 seconds have passed without any mouse activity. During this time, RSIGuard considers the user to be in the "mouse-active state". The length of time the user is in the "mouse-active state" is added to the "mouse use time" accumulator.

**Time using computer** – *This statistic indicates how much time a user spends working at the computer and is a strong indicator of the magnitude of static exposure to postures associated computer usage. This is especially relevant if unhealthy postures have been identified for a particular employee. This is not a measure of how long a user is working, because it does not measure time at non-computer tasks.* When the user is in "keyboard-active state", "mouse-active state", or both, the user is in "active state". Time using computer is a measure of how many seconds the user is in "active state". Note that this statistic cannot accurately reflect

extended periods of time where a user is viewing the monitor (e.g., reading text) without using the mouse or keyboard. Note also that the mouse-use time added to the keyboard-use time would not be expected to be equal to the total time using the computer, since frequently the user is engaged in using both the mouse and the keyboard. For example, if the user spent 20 minutes using only the mouse, followed by 30 minutes using only the keyboard, followed by 5 minutes using both, mouse time would be 20+5 or 25 minutes, keyboard time would be 30+5 or 35 minutes, and total computer usage would be 20+30+5 or 55 minutes.

**Time user was resting** – *This statistic indicates how long a user spends doing non-computer-related tasks at work.* DataLogger notes the first time each day that a user enters “active state”. After that “start of the day” time, when the user is not in “active-state”, the user is in “idle state”. DataLogger notes the time of transitions from “active state” to “idle state” and the time of transitions from “idle state” to “active state”. The difference between these 2 times is added to the “user resting” accumulator, unless the period of rest exceeds a threshold of 6 hours, in which case it is ignored.

**Start and end times of work** – *These statistics tell the hourly range of computer use during the day which is relevant because work environments can be different at different times of day (e.g. light intensity and source angle, ambient temperature, noise levels).* Start time is the moment RSIGuard first starts up for the day, or, if RSIGuard is left running overnight, the moment the user first uses the keyboard or the mouse. End time is the last time during the day that the user uses the keyboard or mouse. This time range describes how long a person’s workday is. The “number of hours the user uses the computer” statistic divided by the difference between the end and start time tells the percentage of time a user uses the computer.

*The following break-related statistics are recorded daily:*

**Number of suggested breaks that were taken, and Number of suggested breaks that were skipped** – *These statistics tell how often a user stopped working for the full duration of a BreakTimer break vs. how often they pressed the Skip Break button.* When BreakTimer suggests a break, the user is given the choice of taking the break, skipping the break, or postponing the break. These 2 statistics report how many times the user took the breaks vs. skipped the breaks.

**Total time spent taking BreakTimer-suggested breaks** – *This statistic indicates how much time RSIGuard’s BreakTimer has suggested that the employee pause.* Although RSIGuard considers all time without keystrokes or mouse activity over a certain time threshold to be rest, this statistic records only the length of time that the BreakTimer suggests breaks. If this number varies, it indicates that either the user is working more or less, or that they are taking natural breaks more or less. For example, if a user naturally rested for several minutes every 20 minutes, and as a



result, no breaks suggestions from BreakTimer were needed, then this statistic would be zero.

**Amount of time user postponed breaks** – *This statistic tells how long the user postponed taking BreakTimer-suggested breaks.* Rather than count how many times a break is postponed, this statistic counts how much a break is postponed, making it a more meaningful indicator of the user's behavior. Therefore, if five breaks were taken, and this statistic reported twenty minutes of total postponement time, then on average the user is postponing breaks four minutes ( $20 \div 5$ ) per break suggestion.

**Number of natural rests taken** – *These statistics tell how often the user naturally takes breaks of the 4 specified lengths.* These statistics tells how often users take breaks on their own without the help of BreakTimer. Four break lengths are recorded: breaks of 15 seconds or more, 60 seconds or more, 4 minutes or more, and 16 minutes or more. For example, a 17-minute break would be counted in all 4 statistics, and a 2-minute break would be counted in the 15 second and 60 second category. This statistic is a strong indication of a person's natural pattern of taking rest and thus may be an indicator of risk, especially if there are users who don't use the BreakTimer.

**BreakTimer usage** – *This statistic tells whether or not the user is using the BreakTimer.* Used to measure compliance with a requirement to use BreakTimer, this statistic is most relevant when looking at aggregate reports (e.g. to learn what percentage of some category of users use BreakTimer).

**Average break length, and Average time between breaks** – *These statistics tell how the user has configured the BreakTimer with respect to break frequency and length.* Note that this statistic does not describe how often breaks actually occurred or how long breaks actually were. It only tells what the user set the BreakTimer to do. Various factors could make the actual values (shown in other DataLogger statistics) higher or lower.

**Stretch feature usage** – *This statistic tells whether or not the user is using the video stretch demonstrations feature of RSIGuard Stretch Edition.* Used to measure compliance with a requirement to use the stretch feature, this statistic is most relevant when looking at aggregate reports (e.g. to learn what percentage of some category of users use the stretch animations).

**Number of stretch suggestions the user was given** – *This statistic tells how many stretches were shown during breaks.* While this statistic tells that the stretches were shown, it does not, of course, necessarily indicate that the user performed the suggested stretches.

**BreakTimer willpower setting** – *This statistic tells how the user has configured BreakTimer's willpower setting.* Using RSIGuard's aggregate reports, this gives the

program administrator an overall indication of how hard the users feel it is to follow a computer-prescribed break regimen.

The following ForgetMeNot-related statistics are recorded daily:

**ForgetMeNot feature usage compliance** – *This statistic tells whether or not the user is using the ForgetMeNots feature of RSIGuard.* Used to measure compliance with a requirement to use the ForgetMeNots feature, this statistic is most relevant when looking at aggregate reports (e.g., to learn what percentage of some category of users use ForgetMeNots).

**“ForgetMeNot interval” setting** – *This statistic tells at what frequency the user has ForgetMeNots set to appear.* While this statistic tells what the user requested, it isn't the actual frequency at which ForgetMeNots appeared, which can vary due to a number of factors (e.g., placement of longer breaks, user inactivity).

**Microbreak feature usage compliance** – *This statistic tells whether or not the user is using the Microbreaks component of the ForgetMeNots feature of RSIGuard.* Used to measure compliance with a requirement to use the microbreaks feature, this statistic is most relevant when looking at aggregate reports (e.g., to learn what percentage of some category of users use microbreaks).

**Number of microbreaks taken** – *This statistic tells how many microbreaks were shown as part of ForgetMeNots.* If microbreaks are enabled as part of ForgetMeNots, the ForgetMeNots include short microbreaks. This statistic tells how many microbreaks the user took during the workday as part of those ForgetMeNots.

**“Microbreak length” setting** – *This statistic tells how long the user has set microbreaks to be.* During microbreaks the user is asked to pause for a period of time (that can be configured). This statistic tells the length of time of microbreaks.

The following keyboard and mouse-related statistics are recorded daily:

**Cumulative strain exposure from using keyboard & mouse** – *These important statistics predict how much the strain the user has been exposed to as a result of their specific keyboard and mouse activities.* A feature unique to RSIGuard's BreakTimer is that, in addition to monitoring the quantity of mouse and keyboard actions, it also estimates the exposure to strain associated with the actions.

To use an analogy, you could use either a step counter or a GPS app to measure exercise. The step counter might report 1,000 steps in 7 minutes for a slow, flat

walk. It might also report 1,000 steps in 4 minutes for a sprint up a steep hill. Even though they both were 1,000 steps, and the sprint was less activity time, the sprint is a greater physical effort. Similarly, a keystroke counter might report 1,000 keystrokes for 2 different activities that incurred different exposures. A GPS app might record the distance, speed, and change in elevation – and thus could better represent the difference between your slow walk and uphill sprint. Similarly, the strain statistic approximates the physical effort or exposure that resulted from the keyboard or mouse activity.

To do this for the mouse, RSIGuard considers the muscular differences required to perform a single vs. a double click, or a mouse move vs. a mouse drag. For the keyboard, it looks at where the keys you press are on the keyboard (to predict which fingers and reaches were needed). If you press combinations of more than 1 key (e.g., Ctrl+C), it considers what hand postures were likely needed to do so (e.g., Ctrl+F7 likely requires a bent pinky plus a stretched pointer finger). In RSIGuard's model, each mouse action or key group (of 1 or more characters) is assigned a "strain" value, which is an estimated measure of its impact on a user's body based on experiments using baseline electromyography (EMG) tests. Measuring strain is also discussed in the article *A Detailed Analysis of RSIGuard's BreakTimer Feature* located on our website at: <http://www.rsiguard.com/BreakTimerAnalysis.pdf>.

Cority research indicates strain is a stronger indicator of risk from repetition than raw factors like number of keystrokes or mouseclicks, or raw time. An example of why this is so is demonstrated by comparing "a drag and drop operation" to "clicking on 2 links on a web page." The former exposes a user to significantly more strain, since the drag operation keeps several muscles in tension for an extended period of time, potentially while a bent wrist posture is maintained. However, by counting clicks and movement alone, it would appear to be less activity than the latter activity (e.g., "1 click + mouse movement" for the drag and drop vs. "2 clicks plus mouse movement" for clicking on 2 links). A strain measurement would correctly identify the drag and drop operation as a greater exposure. Thus, measuring strain allows one to differentiate between employees who may spend similar amounts of time on the computer, but whose activities expose them to different levels of strain.

A frequent question is "What values mean high, moderate, or low mouse/keyboard usage?" Based on large numbers of samples of RSIGuard users, the UserInsight application provides color-coded graphs to show low, moderate and high usage. Each graph contains context help that can be viewed to see more detail about ranges for each statistic.

Another frequent question about this statistic is, "What level of strain implies a risk?" Strain from mouse and keyboard is best analyzed "relatively". In other words, the change in a user's exposure to strain over time, or the level of strain that various users with similar tasks experience has significance.

Future studies may one day correlate absolute values of strain exposure to risk, but at present, Cority does not suggest that any particular level is either safe or dangerous. If an organization has 100 employees doing a similar task, there may be a correlation between their strain levels and their RSI risk. Therefore, the return on investment for ergonomic interventions will likely be highest for users with the highest strain values. Strain values between mouse and keyboard cannot be compared since the units of strain for mouse and keyboard have been individually normalized to whole numbers.

How accurately is strain being measured? RSIguard likely measures strain more accurately than any other method available, with the impractical exception of full-time monitoring of an EMG device attached to a user. But RSIguard's strain measurements are still only approximations based on the strain measured in wrist muscle groups. Different workstations, as well as different psychological and physical patterns, all affect muscle strain in the wrists, and other parts of the body also experience muscle strains that are less affected by which particular actions are being performed on the keyboard/mouse. Also, although strain is accepted to be a significant factor for RSI risk, there are other factors such as break taking patterns, time at the computer, postural factors, and individual psychological and physiological differences.

**Total number of keystrokes/mouse clicks** – *This statistic is another indication of how much a user is using the keyboard/mouse.* DataLogger collects the number of keystrokes pressed (without regard to which key is being pressed) and the number of mouse clicks clicked (without regard to which mouse button is being clicked). Double and triple mouse clicks are counted as two and three clicks respectively.

**Average keypress force intensity** – *This statistic indicates the relative force the user was using to strike keys.* See the Keyboard Analysis Tool description below for more detail about this statistic.

**Total number of times user switched between keyboard & mouse** – *This statistic indicates how much a user is statically using one input device vs. dynamically switching back and forth from keyboard to mouse.* DataLogger tabulates how often the user switches between the mouse and keyboard. Each switch from using the keyboard to the mouse or from using the mouse to the keyboard counts as one switch.

**Number of mouse left clicks, middle clicks, and right clicks** – *These statistics tell how many times the user did each of the specified type of mouse click.* This raw data tells how often the user used each type of these mouse clicks. It does not indicate whether these were drag and drops or plain clicks (these are recorded in the mouse strain statistics and in the manual mouse drag & drop statistic).

**Distance mouse traveled** – *This statistic indicates a relative value that indicates how much the user moves the mouse cursor.* Mouse distance is the distance the

cursor moves on the screen and is a reasonable indication of how much the user physically moves the mouse. This statistic is most relevant when used to compare how a user changes over time or how they compare to another user with a similar pointing device. Because of differences in mouse drivers, mouse settings (e.g. acceleration, speed, sensitivity, etc.), and pointing device hardware, there is no way to determine precise distance using a real-world unit like meters. For convenience, the number is presented in reports as a distance in meters. However the conversion is approximate and should primarily be used for relative comparisons of pointer device movement (e.g. a report of 10 meters is twice as much movement as a report of 5 meters). Note that if you export this statistic, it appears as a number of screen pixels over which the cursor traveled (as opposed to meters).

**Number of mouse double clicks** – *This statistic tells how many times the user performed a double click.* This raw data indicates how frequent double clicks are for this user.

**Number of manual mouse drag & drops** – *This statistic tells how often the user performs a drag & drop operation.* This statistic is an important indication of how much exposure a user has to straining mouse activity. One can compare this statistic to the number of mouse clicks to see what percentage of mouse activity is drag & drop (or selection actions). People with high ratios should be exposed to using KeyControl to do mouse-button-free drag & drops.

**Number of KeyControl assisted drag & drops** – *This statistic tells how often the user performs drag & drops operations using KeyControl.* This statistic is an indication of how well the user is taking advantage of KeyControl to reduce strain associated with drag & drop. If the number is low compared to manual drag & drops, users can receive additional training in using the feature.

**AutoClick feature usage compliance** – *This statistic tells whether or not the user is using the AutoClick feature of RSIGuard.* Used to measure compliance with a suggestion to use the AutoClick feature, this statistic can be especially relevant when looking at aggregate reports (e.g., to learn what percentage of some category of users use AutoClick).

**Number of AutoClicks** – *This statistic tells how many times the user lets AutoClick for them.* This is an excellent indication of how much value a user is getting out of AutoClick as this is roughly proportional to the strain reduction that results from using AutoClick. If a user is using AutoClick but this number is not much higher than the manual left mouse clicks, the user probably needs additional training with AutoClick.

**“KeyControl keyboard re-mapping feature enabled” setting** – *This statistic tells whether or not the user is using the re-mapping component of the KeyControl feature of RSIGuard.* Used to measure compliance with a suggestion to use the re-mapping feature, this statistic can be especially relevant when looking at aggregate

reports (e.g., to learn what percentage of some category of users use keyboard re-mapping).

**Number of KeyControl hotkeys used** – *This statistic tells how many times the user has used one of the KeyControl hotkeys.* KeyControl hotkeys can reduce strain associated with the action they are created to replace. Therefore, this statistic is a gross indication of the overall strain reduction the user benefits from by using KeyControl hotkeys.

**Total number of keyboard errors** – *This statistic indicates how many errors the user is making at the keyboard.* DataLogger counts unique groupings of the backspace or the delete key on the keyboard. For example, if a user types: “erfonomic” and presses backspace eight times to change the ‘f’ to a ‘g’, DataLogger counts one error. This is because the user made only one error, even though it required several backspace presses to correct it.

**Words typed/speed** – *This statistic indicates how much of the user’s keyboarding is typing of text. Note that it will always be substantially lower than a traditional measurement of typing speed since it includes all keyboard activity.* DataLogger collects the number of words typed. The number of words a user types gives an indication of the type of work they are doing (e.g. textual entry vs. keystrokes in database fields). A new word is defined as a series of alpha keys followed by a space or the return key. Text writing produces high “words typed” values. Programming and text editing produce lower values. Keyboard shortcut work, tabbing, use of arrow keys, etc., do not contribute to “words typed” values. Speed is determined by dividing total words typed over total keyboard time. As a result, this is not a traditional “typing speed” measurement, because it includes all the time the user spends at the keyboard, even if they are not typing text.

## **Overall work intensity statistics**

The statistics in this section are computed based on computer usage from the moment RSiGuard is installed henceforth. Although the data is recorded daily, the value that is recorded is merely the overall average as it was on the date of recording.

**Intensity of keyboard and mouse use** – *These statistics indicate over the course of time how intensely the user uses the keyboard and the mouse.* These values are a continuous collection of strain divided by the time over which the strain was accumulated. Although a snapshot of these values is recorded each day, the values are an accumulation over many days. When the values reach a threshold, they are divided in half, thus expiring some of the significance of older data. In this way, RSiGuard can maintain an understanding of a user's changing intensity of use of the keyboard and mouse in a way that filters out the noise of short term fluctuations while still giving higher significance to more recent activity. This statistic (along with others) is used by the BreakTimer to help guide the timing of breaks. Specifically, this statistic ensures that breaks occur, on average, in a more evenly spaced manner.

**Average keystroke intensity** – *This statistic indicates how hard the user strikes keys on the keyboard.* This statistic takes the keyboard analysis tool's keystroke intensity measurements for individual keys, and computes an average over all keys, to provide a general value for how hard the user is hitting keys. This statistic, however, can only be used as a relative measurement. If a group of users all use the same keyboard, then one can use this value to see who strikes their keys harder than others. If one can observe that a user pounds their keyboard, one can use this statistic to see if attempts to get the user to lighten up (e.g., using ForgetMeNot reminders) are working. See the Keyboard Analysis Tool description for additional details on this statistic.

## **Keyboard Analysis Tool statistics**

The next three statistics are collected by DataLogger's keyboard analysis tool. These statistics are not collected daily, but rather over all time. Approximately once every 6 months, the data is reduced (i.e. the numerator, what is being measured, and the denominator, the number of samples, are both divided by two) so that eventually new data will have more significance than older data.

**How many times each key is used relative to total number of keystrokes** – *This statistic indicates which keys the user uses most frequently.* This statistic tells, for each key on the keyboard, what percentage of keystrokes this key comprises. For example, a value of 2 for 'A' and 8 for the Tab-Key indicates that 2% of all keystrokes are 'A', and 8% are the Tab-Key, etc.

**Keystroke force intensity/How long the user holds each key down on average**

– *This statistic implies how much force is applied when the user strikes each key. Since very few keyboards actually measure the pressure/intensity of a keystroke, this statistic measures the length of time a key is held down. A harder keystroke generally corresponds to a longer period of time during which the switch of each key is actuated. This allows one to see which keys the user is tending to hit harder or softer. This statistic is based on a principle that a harder keystroke will engage the key switch longer than a softer keystroke. Although this is not necessarily true for each individual keystroke, we believe it accurately corresponds to pressure over the course of hundreds or thousands of keystrokes. The reported value is in milliseconds (1/1000th of a second).*

**How long it takes the user to reach each key on average** – *This statistic is being used to experimentally determine dynamic hand position on a keyboard. This statistic measures how long it takes a user to reach each key from whatever previous key they struck. The purpose of this statistic is still being tested, but the hope is that this can be used to help detect hand position on the keyboard as well as detect typing style (hunt & peck vs. touch typing). The reported value is in milliseconds (1/1000ths of a second).*

*An important note on the accuracy of recorded data:*

*DataLogger provides a precise tool for measuring computer use. For typical ergonomic purposes, the accuracy far exceeds what would normally be possible for a human evaluator. This information is provided for researchers who wish to understand the precise limitations of computer-collected usage information.*

*RSIGuard uses a hook into the Windows event system to count mouse/keyboard activity (also called "input events"). This event system is the same system that notifies each application that it has received input events. For example, when a user presses the 'A' key while in a word processor (e.g., Microsoft Word), the 'A' appears in the document because the event system tells the word processor that the 'A' key was pressed. Therefore, if an application responds to an event, it will be recorded under most circumstances. Even when no application is the target of an input event, the input event still passes through the event system and will normally be recorded.*

*There are certain circumstances in which the DataLogger would not detect an input event. DataLogger will not record events:*

- 1. If the computer is not on.*
- 2. If the computer is on, but RSIGuard is not running (e.g., when the user is booting up, logging in, or if the user exits the RSIGuard program).*
- 3. If the user is using non-standard software that bypasses the normal Windows system for input events. Such a program is unlikely, but theoretically possible. (since v4.0.6 input from MS-DOS applications is recorded).*



## Privacy and Security Issues

Employees may perceive DataLogger as an invasion of their privacy because it effectively observes employees and records its observations. You and your employees might also have security concerns. Because Cority is sensitive to these concerns, RSIGuard includes several features designed to assist with the management of employee information in a manner that is consistent with the employer's privacy and security policy:

1. DataLogger collects data that describes the manner in which a computer was used, but does not offer any information about what specific work was done. For example, RSIGuard is intentionally not useful for measuring employee work output. An employee who inappropriately plays a video game for several hours during the workday would show high usage values. As an employee becomes more efficient on the computer, their usages statistics will potentially drop. Thus usage values do not correspond to work output. Although high productivity is a reasonable goal, it is not RSIGuard's role to measure productivity and it does not do so.
2. DataLogger collects information about Work Restriction compliance and Break compliance. In parts of the world that have "no fault" workers compensation laws, the availability of this data to an employer would generally have no negative significance to an employee. In general, it would be of benefit to the employee because it means that an engaged employer would have the ability to intervene when problematic non-compliance is putting an employee at risk. However, in some parts of the world where laws are different, non-compliance could hypothetically be more significant. However, it is reasonable to argue that since the employer has continual access to compliance information, that it is the employer's responsibility to correct any non-compliance (since the employee cannot be expected to be a safety expert). If an employer repeatedly notifies an employee that they are non-compliant, and the employee still willfully remains non-compliant, then it is reasonable for the employer to be aware of this continued non-compliance. As long as an employer is clear with employees about how it will (and will not) use this information, employees will understand that this data is of benefit to them.
3. DataLogger stores keystroke frequency information, but stores no information about the order in which keys are pressed. As a result, this information cannot be used to discover what a user has typed. Computer users should understand that any application they use could potentially record keystrokes and store or transmit this information – however, RSIGuard does not do this. All detailed keystroke information is stored in the user's ".kuf" file. This file is always 5,132 bytes, because it doesn't store what a user types. It only contains: how many times each key on the keyboard is pressed; how many milliseconds each key on the keyboard is held on average; and how many milliseconds pass before the release of the previous key and the down-stroke of next key.

4. RSIGuard has basic protections to prevent a user from seeing another user's usage data without a special password. For additional security, Cority recommends that customers have processes and controls (normally Windows file protections) in place so that DataLogger data is restricted to a limited number of employees who have a 'need to know', such as health, safety or ergonomics staff members. Customers should also communicate to their employees how the data collected will be used.
5. When RSIGuard is uninstalled, RSIGuard leaves the user's configuration in the registry. This information does not contain any usage data. Usage data is not deleted during uninstallation. You can manually delete all data by deleting the user's ".tid" and ".kuf" file.
6. If an employee does not wish to have DataLogger data collected, an RSIGuard administrator can completely disable the collection of DataLogger data from the Admin page of the Settings screen.

For detailed information about technical security issues, please contact RSIGuard support.

## Options for Accessing DataLogger Data

The most straightforward way to access DataLogger data is with the RSIGuard companion program, UserInsight. This program is automatically launched with the current user's data when one selects "View Longterm Usage Statistics" from the "DataLogger Usage Statistics" item under RSIGuard's Tools menu.

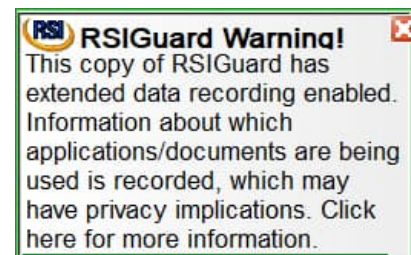
This program allows the user to view the graphs in three sizes (small, medium and large). In addition, the graphs can show the data over ranges of time from as short as one week to as long as one year. Finally, the data can be exported by clicking on the "Export Data" menu item in RSIGuard Report's File menu. The data is exported in a comma-separated text format, which can easily be imported into a spreadsheet, database, or other data analysis tool.

## Extended DataLogger Tools

The DataLogger system allows a program administrator to collect more granular extensive ergonomic information about a user. This information is beneficial for determining causes of repetitive strain injuries and helping to identify individuals who are at risk of developing injuries. If the administrator's research needs necessitate the collection of higher resolution data, the Extended DataLogger tools can be used (available only in the English Windows version of RSIGuard). There are two features provided in RSIGuard that extend data collection possibilities.

1. Normally the DataLogger collects information about a user and records that information once per day. The Extended DataLogger allows an administrator to record that information at an interval as frequent as once per minute. An administrator can also specify that the data be recorded only between two points in time during the day (e.g. 8AM-5PM). Furthermore, at each interval, the name of the foreground application being used is also recorded.
2. The keyboard analysis tool of DataLogger collects information about how the keyboard is used, such as how frequently the user strikes each key. The Extended DataLogger allows the administrator to specify individual keys and key combinations for which one can collect a precise count of how frequently the key is struck, at an interval of recording as frequent as once per minute.

The Extended DataLogger collects information about when and how a user is working, as well as which applications are in use. Therefore, for privacy reasons, users are always notified if the Extended DataLogger is enabled, via a notification that appears every time RSIGuard is started. This warning cannot be disabled.



Unlike the standard DataLogger, the extended DataLogger does not have a graphical user-friendly interface. While it is appropriate for use in the research environment, it is not intended for use by typical end-users or in a typical organization.

### **Enabling extended data recording**

To enable the recording of extended data, one must access the administrative page of the user settings. To do so, while holding of the Ctrl key on your keyboard, click the Tools menu of RSIGuard. Select the first menu item, Administrator's Access. Enter the administrator password, 'adminx'. Next, click on the Setup menu and select the Settings item. Click on the Admin tab and click on the "Data/HSR Settings" button. In the screen that is displayed, enter the start time and the end time during which you want the data to be collected. The time is entered in an unusual format -- number of minutes into day. For example, 1 a.m. would be 60 because 1 a.m. is 60 minutes into the day. Likewise, 8:30 a.m. would be 510 (eight times 60 plus 30). To record data 24 hours a day, you enter a start time a zero and an end time of 1440 (which is 24 times 60). Make sure you press the enable Hi-Res Data Recording checkbox. Data is recorded to the file xxxx-HiResData.txt, in the Data subfolder where RSIGuard was installed. xxxx refers to the Windows username of the currently logged in user.

If you also wish to collect extended data about how frequently a user is using particular key combinations, you will need to create a KeyWatch.txt file. This file must be created in the same folder as the program file RSIGuard.exe. It must contain a list of key combinations that you wish to monitor, one per line, and no more than 64 total key combinations.

The format for defining a key combination is as follows:

CASW###

- C is 1 if the Control key is pressed, or 0 if it is not
- A is 1 if the Alt key is pressed, or 0 if it is not
- S is 1 if the Shift key is pressed, or 0 if it is not
- W is 1 if the Windows key is pressed, or 0 if it is not
- ### is the 3-digit Windows ASCII keycode

Some common keys and their codes follow:

<b>Key</b>	<b>3-Digit Keycode</b>
Backspace	008
Tab Key	009
Enter/Return Key	013
Caps Lock	020
Esc	027
Space	032
Page Up, Page Down	033, 034
End, Home	035, 036
Left, Up, Right, Down arrow	037, 038, 039, 040
Insert, Delete	045, 046
0-9 main keyboard	048-057
A-Z	065-090
Right Click Key	093
Numpad 0-9	096-105
Numpad Multiply, Add, Subtract, Divide	106, 107, 109, 111
F1-F24	112-135
Numlock	144
Scroll Lock	145
Punctuation ; = , -	186, 187, 188, 189
Punctuation. / [ \ ]	190, 191, 219, 220, 221
Open half quote, close half quote	192, 222

Some example entries in the KeyWatch.txt file:

<b>Key combination</b>	<b>7-Digit Entry in KeyWatch.txt File</b>
F1	0000112
Shift F1	0010112
Ctrl Alt Shift Down Arrow	1110040
Spacebar	0000032
Capital A	0010065
Lowercase A	0000065
Ctrl A	1000065
Ctrl Win A	1001065
Windows Key (by itself)	0001000
Ctrl Alt (by itself)	1100000

Key combination use data is recorded to the file xxxx-KeyWatch.txt, in the Data subfolder where RSIGuard was installed. xxxx refers to the Windows username of the currently logged in user.

## **Future Research Plans**

Cority understands that RSIGuard represents a powerful research tool. Many of the statistics measured presently are being measured at the suggestion of current researchers in ergonomics, and there are future plans to collect additional data to meet the needs of other researchers as well as the needs of commercial customers. Cority will endeavor to provide new statistical features to help further the cause of ergonomic research.

To discuss research opportunities with RSIGuard, or any other aspect of DataLogger statistics, please contact RSIGuard support at [support@rsiguard.com](mailto:support@rsiguard.com)

## Appendix 1 – Description of UserInsight Export Fields

Statistic Label	Description
Date	Date data was recorded
WorkSecs	# seconds of mouse or keyboard activity
KbdWorkSecs	# seconds of keyboard activity
BuiltinKbdSecs	# seconds of activity on builtin keyboard for notebook
PtrWorkSecs	# seconds of pointer/mouse activity
BuiltinPtrSecs	# seconds of activity using builtin pointer for notebook
RestSecs	# of inactive seconds between first and last activity of the day
Risk	RSIGuard risk score
OverallBreakComp	Break Compliance considering natural breaks
BasicBreakComp	Break Compliance only considering RSIGuard-suggested breaks
BTEnable%	Percentage of time during day that BreakTimer was enabled
MicrobreakComp	Microbreak compliance
MBEnable%	Percentage of time during day that Microbreaks were enabled
KbdStrain	# of points of keyboard strain
PtrStrain	# of points of pointer/mouse strain
BreaksCompleted	# of RSIGuard-prompted breaks completed
BreaksSkipped	# of RSIGuard-prompted breaks skipped
BreakTime	# of seconds spent in RSIGuard-prompted breaks
PostponementTime	# of seconds RSIGuard-prompted breaks were postponed
StretchesViewed	# stretches shown during breaks
KeypressIntensity	average time keys are held down when pressed -- proxy for key pressure
KeyClicks	# of keypresses
PtrClicks	# of mouse/pointer clicks of any type
PtrKbdSwitches	# of times user switch between using keyboard vs. pointing device
KbdErrors	# of sequences of delete/backspace keys
TotKbdStrain	dynamic statistic (not useful for analysis)
TotKbdSamples	dynamic statistic (not useful for analysis)
TotMseStrain	dynamic statistic (not useful for analysis)
TotMseSamples	dynamic statistic (not useful for analysis)
MseDbClicks	# of double clicks performed
MseLeftClicks	# of left clicks performed
MseMiddleClicks	# of middle clicks performed
MseRightClicks	# of right clicks performed
NumAutoClicks	# of AutoClicks
NumMicroBreaksTaken	# of microbreaks taken

NumMicroBreaksSkipped	# of microbreaks skipped
TotMseDistance	Total # of pixels mouse is moved in pixels
BrkTimerOn	Legacy value of whether BreakTimer is on (use BTEnable% instead)
AvgTimeBetwnBrks	"Avg # of seconds between breaks" setting
AvgBrkLen	"Avg # of seconds in RSIGuard-suggested breaks" setting
WillpowerLevel	Willpower setting (0=high, 3=very low)
FMNOn	Legacy value of whether ForgetMeNots is on (use FMNEnable% instead)
FMNInterval	"Time between ForgetMeNots/Microbreaks" setting
MicroBrksOn	Legacy value of whether Microbreaks is on (use MBEnable% instead)
MicroBrksLen	"# of seconds in a microbreak" setting
AutoClickOn	"Is AutoCLick enabled" setting
KbdRemapOn	"Is Keyboard remapping enabled" setting
StretchOn	"Are stretches enabled" setting
WorkRestrictLen	"Length in minutes of work restriction" setting
ManDragDrops	# of manual drag & drops performed
HotkeyDragDrops	# of drag & drops performed using a hotkey
NatBreaks15sec	# of natural 15-second breaks
NatBreaks60sec	# of natural 60-second breaks
NatBreaks4min	# of natural 4-minute breaks
NatBreaks16min	# of natural 16-minutes breaks
PreemptiveBreaks	# of "preemptive" breaks
WRExceeded	# of minutes work restriction was exceeded
HotkeysUsed	# of KeyControl hotkeys pressed
WordCount	# of words typed (sequence of letters followed by a space)
PoliteTime	# of seconds "Break Needed" button was visible but not pressed
DistNumAM	Rest-Work Distribution Numerator during AM
DistDenAM	Rest-Work Distribution Denominator during AM
DistNumPM	Rest-Work Distribution Numerator during PM
DistDenPM	Rest-Work Distribution Denominator during PM
MaxWork1	# of seconds in longest stretch of mouse/keyboard activity
MaxWork2	# of seconds in 2nd longest stretch of mouse/keyboard activity
MaxWork3	# of seconds in 3rd longest stretch of mouse/keyboard activity
MaxWork4	# of seconds in 4th longest stretch of mouse/keyboard activity
MaxWork5	# of seconds in 5th longest stretch of mouse/keyboard activity
MinsActive	# of minutes during which there was at least some keyboard/mouse activity
MinsActiveWithBT	# of MinsActive where BreakTimer was enabled
MinsActiveWithFMN	# of MinsActive where ForgetMeNots was enabled
MinsActiveWithMB	# of MinsActive where Microbreaks was enabled

SecsDelayBreak	# of seconds RSIGuard-prompted breaks were delayed by filter, polite mode, postpone, etc.
KbdShortcuts	# of keyboard shortcuts (e.g. Alt-F) used
BuiltinWorkSecs	# seconds of activity on builtin keyboard or pointer for notebook
NumKbds	# of keyboards attached to computer
NumPtrs	# of pointing devices attached to computer
NumMonitors	# of monitors attached to computer
ChassisType	type of computer (e.g. laptop, desktop, etc.)
VersEnc	version # encoded as an integer
StartOfDay	# of minutes into day when first activity noted
EndOfDay	# of minutes into day when last activity noted



## Appendix 2 – RSIGuard Fields Key

Field Name	ID	Description
CurPain	CP	Current Discomfort Level from Health Status Reports
Reason	RE	Reason for Health Status Report
Comments	CO	Health Status Report Comments
Department	DE	Health Status Report Department
Location	LO	Health Status Report Location
Organization	OR	Health Status Report Organization
DispDate	DV	Human readable date for data record
Date	DT	Machine readable date for data record
DaysFromToday	DB	# days ago data arriving at OES was recorded (e.g. -1=yesterday)
IsTodaysData	TD	1 if data is from today and therefore may be incomplete
EmployeeID	ID	Employee ID
MedicalVisits	MV	Health Status Reports Medical Visits
Name	NM	Health Status Reports Name
Phone	PH	Health Status Report Phone
NormalPain	NP	Health Status Report Typical Discomfort Level
OtherSymptoms	OS	Health Status Report Other Symptoms
PainFreq	PF	Health Status Report Discomfort Frequency
RSIGuardID	RI	RSIGuard installation ID
WinUser	RU	Windows username
WorkWellID	WI	OES ID number
Quest1	AI	Health Status Report (1st question, default Anti Inflammatory use)
Quest2	PK	Health Status Report (2nd question, default Pain Medication use)
Quest3	WB	Health Status Report (3rd question, default Wrist Brace use)
Quest4	CQ	Health Status Report (4th question, default Contact info)
BackLowerR	BR	Health Status Report Discomfort Location
BackLowerL	BL	Health Status Report Discomfort Location
BackLowerC	BC	Health Status Report Discomfort Location
UpperChestR	CR	Health Status Report Discomfort Location
UpperChestL	CL	Health Status Report Discomfort Location
EyeR	ER	Health Status Report Discomfort Location
EyeL	EL	Health Status Report Discomfort Location
ForearmR	FR	Health Status Report Discomfort Location
ForearmL	FL	Health Status Report Discomfort Location
InnerElbowR	IR	Health Status Report Discomfort Location

InnerElbowL	IL	Health Status Report Discomfort Location
FingersR	GR	Health Status Report Discomfort Location
FingersL	GL	Health Status Report Discomfort Location
ElbowR	LR	Health Status Report Discomfort Location
ElbowL	LL	Health Status Report Discomfort Location
NeckShoulderR	NR	Health Status Report Discomfort Location
NeckShoulderL	NL	Health Status Report Discomfort Location
BackPalmR	PR	Health Status Report Discomfort Location
BackPalmL	PL	Health Status Report Discomfort Location
ShoulderJointR	SR	Health Status Report Discomfort Location
ShoulderJointL	SL	Health Status Report Discomfort Location
ThumbR	TR	Health Status Report Discomfort Location
ThumbL	TL	Health Status Report Discomfort Location
ScapulaR	UR	Health Status Report Discomfort Location
ScapulaL	UL	Health Status Report Discomfort Location
WristR	WR	Health Status Report Discomfort Location
WristL	WL	Health Status Report Discomfort Location
Neck	NE	Health Status Report Discomfort Location
Head	HE	Health Status Report Discomfort Location
DaysInAvg	DA	For averaged data, # of days where there was activity (e.g. 20 for 5-day work week over 4 weeks)
DaysInSamp	DS	For averaged data, # of calendar days included in average (e.g. 28 for 4 week sample period)
IntensityM	IM	Measure of mouse strain per unit time
IntensityK	IK	Measure of keyboard strain per unit time
TraumaM	TM	Mouse strain exposure
TraumaK	TK	Keyboard strain exposure
HoursM	HM	Mouse usage hours
HoursK	HK	Keyboard usage hours
WordsPerDay	RW	Words typed
KeypressIntensity	KI	Average time (msec) keys are held down
TotalHours	TH	Hours of computer usage
TotalRest	RT	Hours inbetween periods of activity
BreaksTaken	BK	# BreakTimer breaks taken
BreakTime	BT	Time spent in BreakTimer breaks
StretchesViewed	SV	# videos presented during BreakTimer breaks
BreaksSkipped	BS	# BreakTimer breaks skipped
PostponeTime	PT	Time breaks were postponed with Postpone buttons
Keypresses	KC	# keypresses
MouseClicks	CC	# mouse clicks
Typos	TC	# of sets of backspace/delete keypresses
MseKbdSwitches	SC	# of times user switches from mouse to keyboard use or

		vice versa
RestWorkDistNumAM	ZA	Duty cycle measure (AM numerator)
RestWorkDistDenAM	ZB	Duty cycle measure (AM denominator)
RestWorkDistNumPM	YQ	Duty cycle measure (PM numerator)
RestWorkDistDenPM	ZD	Duty cycle measure (PM denominator)
LongestWorkPeriod0	ZE	Longest period of activity without minimal pause (default min pause=30 sec)
LongestWorkPeriod1	ZF	2nd longest period of activity
LongestWorkPeriod2	ZG	3rd longest period of activity
LongestWorkPeriod3	ZH	4th longest period of activity
LongestWorkPeriod4	ZI	5th longest period of activity
KeyHoldTimeNumLeftAM	ZJ	Amount of time keys are held down on left side of keyboard in AM
KeyHoldTimeNumRightAM	ZK	Amount of time keys are held down on right side of keyboard in AM
KeyHoldTimeDenLeftAM	ZL	# of keys that were pressed on left side of keyboard in AM
KeyHoldTimeDenRightAM	YR	# of keys that were pressed on right side of keyboard in AM
KeyHoldTimeNumLeftPM	ZN	Amount of time keys are held down on left side of keyboard in PM
KeyHoldTimeNumRightPM	ZO	Amount of time keys are held down on right side of keyboard in PM
KeyHoldTimeDenLeftPM	ZP	# of keys that were pressed on left side of keyboard in PM
KeyHoldTimeDenRightPM	ZQ	# of keys that were pressed on right side of keyboard in PM
KeyHoldTimeVariabilityLeftAM	ZR	Variability in keypress time on left side of keyboard in AM
KeyHoldTimeVariabilityRightAM	ZS	Variability in keypress time on right side of keyboard in AM
KeyHoldTimeVariabilityLeftPM	ZT	Variability in keypress time on left side of keyboard in PM
KeyHoldTimeVariabilityRightPM	ZU	Variability in keypress time on right side of keyboard in PM
MouseClickedTimeNumAM	YA	Amount of time mouse buttons are held down in AM
MouseClickedTimeDenAM	YB	# of mouse buttons pressed in AM
MouseClickedTimeNumPM	YC	Amount of time mouse buttons are held down in PM
MouseClickedTimeDenPM	YD	# of mouse buttons pressed in PM
MouseClickedTimeVariabilityAM	YE	Variability in mouseclick time in AM
MouseClickedTimeVariabilityPM	YF	Variability in mouseclick time in PM
WordCountAM	YG	Words typed in AM
WordCountPM	YH	Words typed in PM
KbdErrorsAM	YI	Typos (TC) in AM
KbdErrorsPM	YJ	Typos (TC) in PM
VersionNumber	YK	RSIGuard version #
TodaysBuiltinWorkSeconds	YS	Time spent using builtin keyboard or pointer of notebook

Today'sBuiltinKbdWorkSeconds	YL	Time spent using builtin keyboard of notebook
Today'sBuiltinPtrWorkSeconds	YM	Time spent using builtin pointer of notebook
Today'sTimeWaitingInPoliteMode	YT	Time spent with "Break Needed" button displayed before BreakTimer break is started
MinutesOfActivity	TA	Minutes during day in which there was at least 1 second of activity
MinutesOfActivityWithBTEnabled	TB	TA minutes when BreakTimer was enabled
MinutesOfActivityWithFMNEnabled	TE	TA minutes when ForgetMeNotes were enabled
MinutesOfActivityWithMBEnabled	TF	TA minutes when Microbreaks were enabled
SecondsOfDelayedBreak	TG	Total time BreakTimer breaks were needed but not presented (e.g. filters, postpone, polite mode, etc.)
Today'sKeyboardShortcuts	KS	# of Windows keyboard shortcuts used (e.g. Ctrl+C)
NumKbds	YN	# of keyboards Windows reports are attached to computer
NumPtrs	YO	# of pointers Windows reports are attached to computer
NumMonitors	YP	# of monitors Windows reports are attached to computer
ChassisType	ZZ	Computer type
KbdHash0	ZV	Primary keyboard vendor code hash
KbdHash1	ZW	Secondary keyboard vendor code hash
PtrHash0	ZX	Primary pointer vendor code hash
PtrHash1	ZY	Secondary pointer vendor code hash
MicroBreaksTaken	MT	# ForgetMeNot microbreaks taken
MicroBreaksSkipped	MN	# ForgetMeNot microbreaks skipped
MouseDistance	MM	Distance mouse was moved
MouseDoubleClicks	DC	# of pointer double clicks
MouseLeftClicks	LC	# of pointer left clicks
MouseMiddleClicks	IC	# of pointer middle clicks
MouseRightClicks	RC	# of pointer right clicks
MouseScrolls	MW	# of pointer scroll clicks
NumAutoClicks	AC	# of AutoClicks
TouchActivityTime	TI	Estimate of how much time a user spends touching (s)
TouchHoldTime	TT	Estimate of how long the average touch persists (msec)
Today'sTouchCount	TN	Total number of daily touches
BTEnabled	BE	BreakTimer enabled (use TB/TA instead)
OESCalced_BTEnabled	AB	OES version of BE
AvgTimeBetweenBreaks	BI	BreakTimer setting for avg time between breaks
AvgBreakLen	BD	BreakTimer setting for avg break length
WillpowerLevel	WP	BreakTimer willpower level
FMNEnabled	FE	ForgetMeNotes enabled (use TE/TA instead)
OESCalced_FMNEnabled	AF	OES version of FE
FMNFrequency	FF	ForgetMeNotes setting for time between ForgetMeNotes
MicroBreaksEnabled	ME	Microbreaks enabled (use TF/TA instead)

OESCalced_MicroBreaksEnabled	AD	OES version of AD
MicroBreaksLength	MD	ForgetMeNots setting for length of ForgetMeNots microbreaks
ACEnabled	AE	AutoClick enabled
RemapEnabled	KE	Keyboard remap enabled
StretchesEnabled	SE	Stretches in BreakTimer breaks enabled
WorkRestrictionLength	WD	Length of a programmed time-based work restriction
NumManualDragDrops	DD	# of manual drag & drop/selection operations performed
NumKCDragDrops	KD	# of drag & drop/selection operations done using KeyControl hotkey
NumNatBreaks15sec	NA	# of natural pauses >=15 seconds
NumNatBreaks60sec	NB	# of natural pauses >=60 seconds
NumNatBreaks4min	NC	# of natural pauses >=4 minutes
NumNatBreaks16min	ND	# of natural pauses >=16 minutes
NumPreemptiveBreaks	PB	# of preemptive breaks
NumHSRsFiledDEPRECATED	HF	not used
WRExceededFactor	WE	Amount by which a time-based work restriction was exceeded
NumHotkeysUsed	KH	# of KeyControl hotkeys used
StartOfDay	SD	Minutes from midnight that first activity occurred
EndOfDay	ED	Minutes from midnight that last activity occurred
EmailAddress	EA	Email address
RSIGuardVersion	RV	RSIGuard version #
BasicBreakCompliance	CB	% of BreakTimer breaks suggested that were taken
OESCalced_BasicBreakCompliance	ZC	OES version of CB
OverallBreakCompliance	CD	BreakTimer compliance considering natural breaks and delayed breaks
OverallBreakComplianceNoBT	CE	Break compliance if BreakTimer breaks hadn't been taken (to estimate BreakTimer benefit)
OESCalced_OverallBreakCompliance	PC	OES version of CD
MicrobreakCompliance	CI	Microbreak compliance
OESCalced_MicrobreakCompliance	ZM	OES version of CI
OverallRiskLevel	OK	Overall risk considering mouse/kbd activity level and time, as well as break/microbreak compliance
OESCalced_OverallRiskLevel	OL	OES version of OK
MgrComments	MC	Health Status Reports internal
MgrStatus	MS	Health Status Reports internal
MgrReportNum	RN	Health Status Reports internal
MgrDateFirstView	DF	Health Status Reports internal
MgrDateWorkStart	DW	Health Status Reports internal
MgrDateResolved	DR	Health Status Reports internal
MgrSurveyType	MX	Health Status Reports internal
IsNotebook	IN	True if a notebook computer

MaxScreenHeight	SX	Tallest screen of 1-N monitors
MinScreenHeight	SN	Widest screen of 1-N monitors
TotalScreenWidth	SW	Total width of 1-N monitors
EstimatedIconSize	IS	Estimate inches of icons on screen (considers screen rendering)
ChassisWeight	CW	Weight of computer
ProfileName	PN	User-specified profile name
CurrentTime	CT	Not used
AvgKbdStrainPerMin	AK	Dynamic (not used external to RSIGuard)
CurrentKbdTrauma	CK	Dynamic (not used external to RSIGuard)
CurrentKbdTraumaTrigger	KB	Dynamic (not used external to RSIGuard)
AvgMouseStrainPerMin	AM	Dynamic (not used external to RSIGuard)
CurrentMouseTrauma	CM	Dynamic (not used external to RSIGuard)
CurrentMouseTraumaTrigger	MB	Dynamic (not used external to RSIGuard)
LastBreak	LB	Time of last break
ApplicationName	AN	Name of RSIGuard application

### Appendix 3 – Key to RSIGuard Settings Transmission to OES

WWID	OES GUID
rsiv	RSIGuard version
btisabs	Is max time between breaks absolute (ignores natural rest) [boolean]
actd	AutoClick trigger distance [pixels]
kbid	Windows device ID of keyboard
mbmode	Microbreaks enabled [boolean]
btes	Sound after break enabled [boolean]
btsbw	Skip break wizard enabled [boolean]
wrkrstrctmbmprd	Period of min-by-min work restriction [minutes]
wrkrstrcten	Is work restriction enabled [boolean]
btmmbv	Min time between breaks [minutes]
MID	GUID of machines
fmps	Is ForgetMeNots sound enabled [boolean]
hotkeycnt	# of KeyControl hotkeys defined
wrkrstrcttime	Length of work restriction [hours]
btws	Sound before break enabled [boolean]
btwp	Willpower level [0 high, 3 very low]
nb	Computer's name as reported by OS
btof	BreakTimer Average Interval [non-human-usable unit]
ptman	Pointing device manufacturer
lgge	3-digit code of language selected by user
ptid	Windows device ID of pointing device
actt	AutoClick trigger time [deciseconds]
btmpl	BreakTimer sensitivity to mouse usage [level]
wrkrstrctmbnen	Is min-by-min work restriction enabled [boolean]
zd1	User's timezone [GMT offset]
zd2	User's timezone name
bl	Length of microbreak [seconds]
aton	Is AutoClick enabled [boolean]
breakon	Is BreakTimer enabled [boolean]
p	RSIGuard settings profile name
btpl	BreakTimer sensitivity to keyboard usage [level]
bthb	Does BreakTimer hide screen during breaks [boolean]
fminv	Time until MicroBreaks move to center screen [seconds]
t	unused (value is notauthorized backwards)
uion	RSIGuard or OES Desktop User Interface
u	OS username
wrkrstrctmbmmax	Max minutes of activity per period for min-by-min work restriction
fmnint	ForgetMeNots interval

fmcnt	Number of ForgetMeNot messages
btmxbe	Is max-time between breaks enabled [boolean]
os	OS version
fmne	Do ForgetMeNots move to center of screen if ignored [boolean]
pttyp	Type of pointing device (see \$sys(PtrType) in <a href="https://www.rsiguard.com/documents/itstaff/RSIScriptHelp.pdf">https://www.rsiguard.com/documents/itstaff/RSIScriptHelp.pdf</a> )
btml	Minimum break length [minutes]
btmxbv	Max time between breaks [minutes]
rnmd	Is Call Center mode enabled [boolean]
btmbe	Is min-time between breaks enabled [boolean]
fmnon	Are ForgetMeNots enabled [boolean]
ptid2	Windows device ID of secondary pointing device
kbid2	Windows device ID of secondary keyboard