



Zmachine Data Viewer Software Quick Start



Reviewing Zmachine Insight/Insight+ Data

About this Document

You are advised to read and understand this entire document and to review the reference documents prior to implementation.

Reference Documents

Zmachine Clinician Instructions and Service Manual

Intended Audience

Healthcare providers using the Zmachine Insight or Insight+ system.

Notice

The information in this document has been carefully checked and is believed to be accurate. However, in the interest of continued product development, General Sleep Corporation ("GSC") reserves the right to make changes and improvements to this document and to the product(s) that it describes, at any time, and without notice or obligation.

This Document is educational in nature; it describes software designed to review Zmachine data. This document does not provide medical advice. It is the responsibility of the physician or other authorized medical provider ("Medical Provider") to exercise his/her medical judgment in determining the appropriate treatment plan for his/her patient. The Medical Provider should appropriately counsel patients about the benefits and risks of the proposed treatment.

Zmachine®, Z® logo, and General Sleep® are registered trademarks of General Sleep Corporation. The Zmachine has been designed and developed by General Sleep Corporation, Cleveland, Ohio, USA.

Mailing and Shipping Address

General Sleep Corporation
26250 Euclid Avenue, Suite 709
Cleveland, OH 44132, USA

Telephone

(216) 289-2331

Web Site

www.GeneralSleep.com

Document Revision

1.0

Table of Contents

Software Installation	1
Generate Sleep Report	2
Importing Zmachine Data	4
Sleep Staging Display.....	6
Overview	6
Displaying Multiple Days.....	8
Changing Views	10
Viewing EEG Data.....	12
Location of Data Files	13

Software Installation

The Zmachine PC Data Viewer software can be obtained directly from the General Sleep Corporation website Support Section:

<http://generalsleep.com/insight.html#support>

This software was designed for computers running Windows 7 or higher. You can download and install this free software on as many machines as needed. The installation process is self-guided and all imported Zmachine data will remain local to your computer.

Following successful installation of this software, the following icon will appear on your desktop. Double click the icon to launch the program.



Generate Sleep Report

To generate the output files needed to visualize acquired data, a sleep report must be generated on the Zmachine prior to importing as follows:

Insert Zmachine Clinician Key into Zmachine and press the OK button to boot



When the Zmachine System Menu appears, select Generate Report and press the OK button

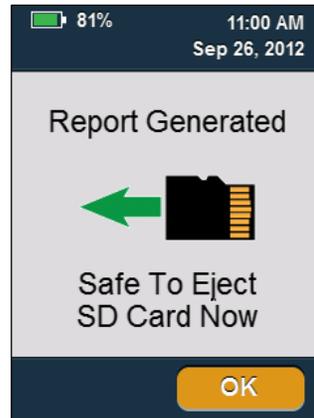


This screen will be displayed during report generation



When report generation has finished, this screen will be displayed

Note: If you do not wish to eject the memory card at that time, simply press the OK button to return to the main menu



Eject memory card



Withdraw protruding memory card from slot



Remove Clinician Key



Importing Zmachine Data

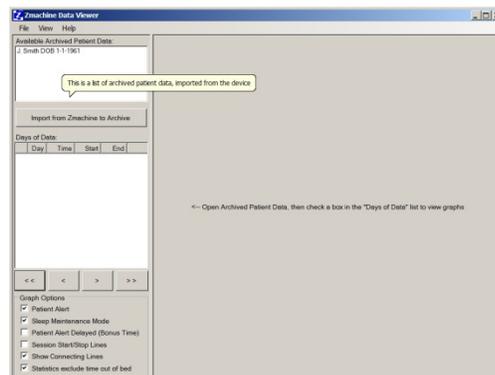
Insert memory card into USB card reader



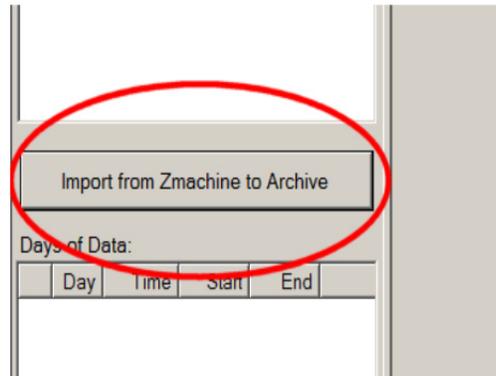
Plug USB card reader into computer running Windows 7 or higher



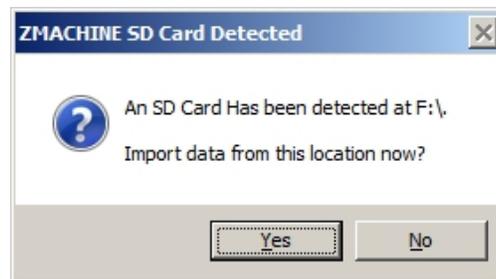
Double click icon to launch the Zmachine Data Viewer Software



Click the *Import from Zmachine to Archive to Archive* button



Click Yes to continue



Type a name for the imported data, or click arrow on right to add to an existing name, then click OK



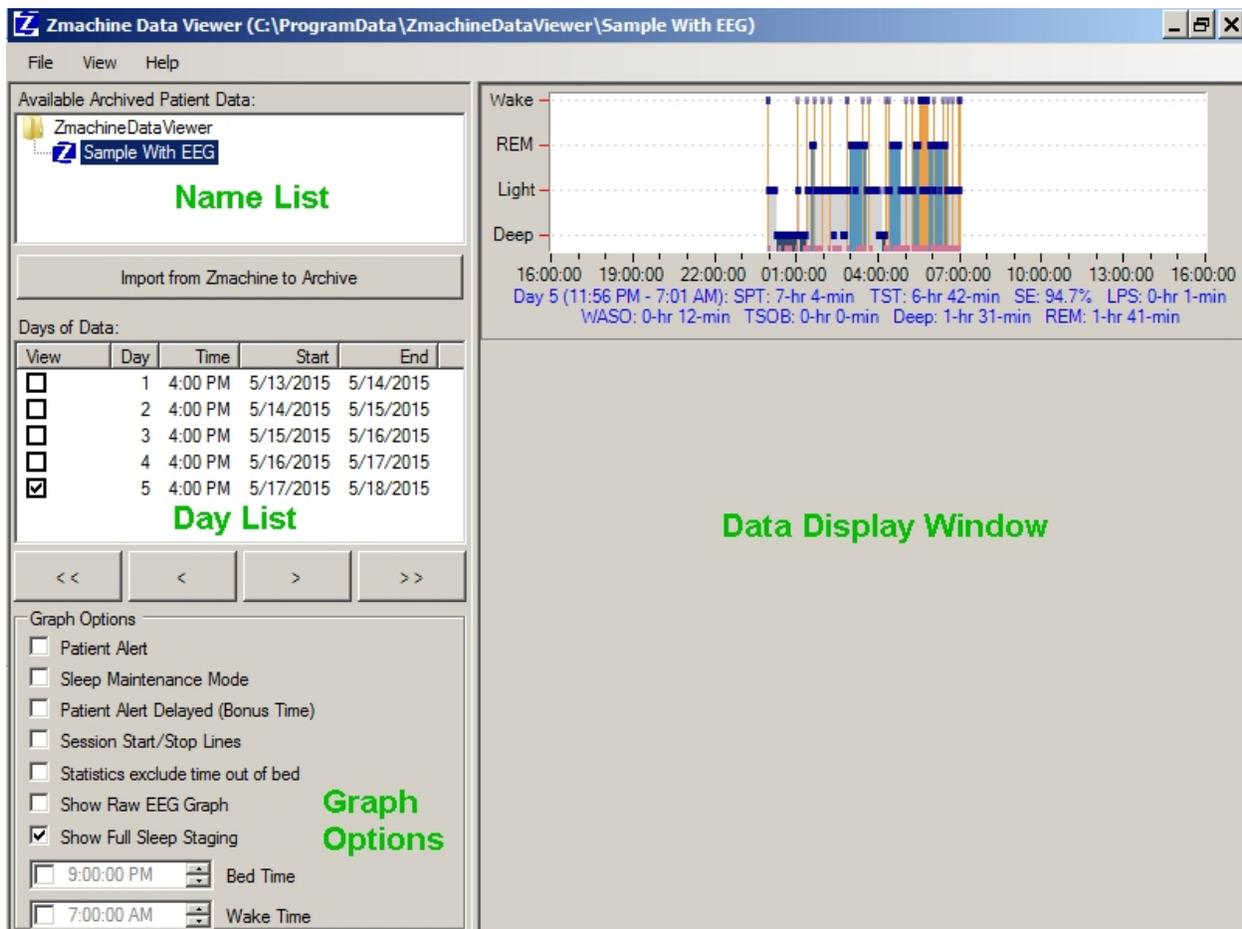
After the data has been imported, safe eject USB card reader from computer and replace memory card in Zmachine.



Sleep Staging Display

Overview

The main display is divided into four primary sections: The Name List, Day List, Graph Options and Data Display Window as shown.



The **Name List** contains the names of all imported datasets. Clicking a name from this list will load all data into the Day List.

The **Day List** contains a complete list of all recording days for any dataset. Days are broken into 24-hour periods using the Day Break Time setting in the Zmachine (default is 4 p.m.).

The **Data Display Window** will graph each day selected from the Day List. Each graph shows 24 hours of time. Summary statistics for each recording day are shown immediately below each graph (blue text).

The summary statistics displayed for each day are:

- SPT - Sleep Period Time
- TST - Total Sleep Time
- SE - Sleep Efficiency
- LPS - Latency to Persistent Sleep
- WASO - Wake After Sleep Onset
- TSOB - Time Spent Out of Bed
- Deep - Total Slow Wave Sleep
- REM - Total REM Sleep

Note: To display summary graphs of these statistics across some/all days, select **View -> Statistics**

The **Graph Options** panel controls the information and markers that can be displayed in the Data Display Window.

The graph options are:

- Patient Alert – marks the point in time where a CBTi alert was presented to the patient (Insight+ only)
- Sleep Maintenance Mode – marks point in time when patient entered contiguous sleep (Insight+ only)
- Patient Alert Delayed (Bonus Time) – CBTi Patient Alert was delayed because patient achieved some sleep (Insight+ only)
- Session Start/Stop Lines – points in time where Zmachine was disconnected and re-connected (especially helpful for visually marking short intervals such as bathroom breaks)
- Statistics Exclude Time Out of Bed – Summary statistics can include or ignore time spent out of bed (i.e. when patient was disconnected from Zmachine)
- Show Raw EEG Graph – display strip chart with raw EEG data displayed for any selected epoch
- Show Full Sleep Staging – display full sleep staging information or simple wake/sleep graph(s)

Displaying Multiple Days

Clicking any view box in the Day List will cause that data to be displayed in the Data Display Window. Data may be de-selected by clicking a second time. The example shows three days of data selected for display (see arrow).

The screenshot displays the Zmachine Data Viewer interface. On the left, the 'Available Archived Patient Data' section lists 'ZmachineDataViewer' and 'Sample With EEG'. Below this is an 'Import from Zmachine to Archive' button. The 'Days of Data' table is as follows:

View	Day	Time	Start	End
<input type="checkbox"/>	1	4:00 PM	5/13/2015	5/14/2015
<input type="checkbox"/>	2	4:00 PM	5/14/2015	5/15/2015
<input checked="" type="checkbox"/>	3	4:00 PM	5/15/2015	5/16/2015
<input checked="" type="checkbox"/>	4	4:00 PM	5/16/2015	5/17/2015
<input checked="" type="checkbox"/>	5	4:00 PM	5/17/2015	5/18/2015

Below the table are navigation buttons: '<<', '<', '>', and '>>'. The 'Graph Options' section includes:

- Patient Alert
- Sleep Maintenance Mode
- Patient Alert Delayed (Bonus Time)
- Session Start/Stop Lines
- Statistics exclude time out of bed
- Show Raw EEG Graph
- Show Full Sleep Staging
- 9:00:00 PM Bed Time
- 7:00:00 AM Wake Time

The right side of the window shows three stacked hypnograms for Day 3, Day 4, and Day 5. Each hypnogram displays sleep stages (Wake, REM, Light, Deep) over a 24-hour period. The statistics for each day are:

- Day 3 (11:39 PM - 7:35 AM):** SPT: 7-hr 56-min, TST: 7-hr 35-min, SE: 95.7%, LPS: 0-hr 4-min, WASO: 0-hr 3-min, TSOB: 0-hr 0-min, Deep: 1-hr 8-min, REM: 2-hr 48-min
- Day 4 (12:55 AM - 7:25 AM):** SPT: 6-hr 29-min, TST: 6-hr 15-min, SE: 96.4%, LPS: 0-hr 2-min, WASO: 0-hr 2-min, TSOB: 0-hr 0-min, Deep: 1-hr 25-min, REM: 2-hr 26-min
- Day 5 (11:56 PM - 7:01 AM):** SPT: 7-hr 4-min, TST: 6-hr 42-min, SE: 94.7%, LPS: 0-hr 1-min, WASO: 0-hr 12-min, TSOB: 0-hr 0-min, Deep: 1-hr 31-min, REM: 1-hr 41-min

A shortcut to **turn all days on or off** is to click the word **View** immediately above the selection boxes (see arrow).

Zmachine Data Viewer (C:\ProgramData\ZmachineDataViewer\Sample With EEG)

File View Help Close

Available Archived Patient Data:

- ZmachineDataViewer
 - Sample With EEG

Import from Zmachine to Archive

Days of Data:

View	Day	Time	Start	End
<input checked="" type="checkbox"/>	1	4:00 PM	5/13/2015	5/14/2015
<input checked="" type="checkbox"/>	2	4:00 PM	5/14/2015	5/15/2015
<input checked="" type="checkbox"/>	3	4:00 PM	5/15/2015	5/16/2015
<input checked="" type="checkbox"/>	4	4:00 PM	5/16/2015	5/17/2015
<input checked="" type="checkbox"/>	5	4:00 PM	5/17/2015	5/18/2015

Graph Options:

- Patient Alert
- Sleep Maintenance Mode
- Patient Alert Delayed (Bonus Time)
- Session Start/Stop Lines
- Statistics exclude time out of bed
- Show Raw EEG Graph
- Show Full Sleep Staging

9:00:00 PM Bed Time

7:00:00 AM Wake Time

Day 1 (11:21 PM - 6:52 AM): SPT: 7-hr 31-min TST: 6-hr 58-min SE: 92.7% LPS: 0-hr 7-min
WASO: 0-hr 8-min TSOB: 0-hr 0-min Deep: 1-hr 32-min REM: 2-hr 4-min

Day 2 (11:22 PM - 6:44 AM): SPT: 7-hr 21-min TST: 6-hr 57-min SE: 94.5% LPS: 0-hr 9-min
WASO: 0-hr 3-min TSOB: 0-hr 0-min Deep: 1-hr 41-min REM: 2-hr 17-min

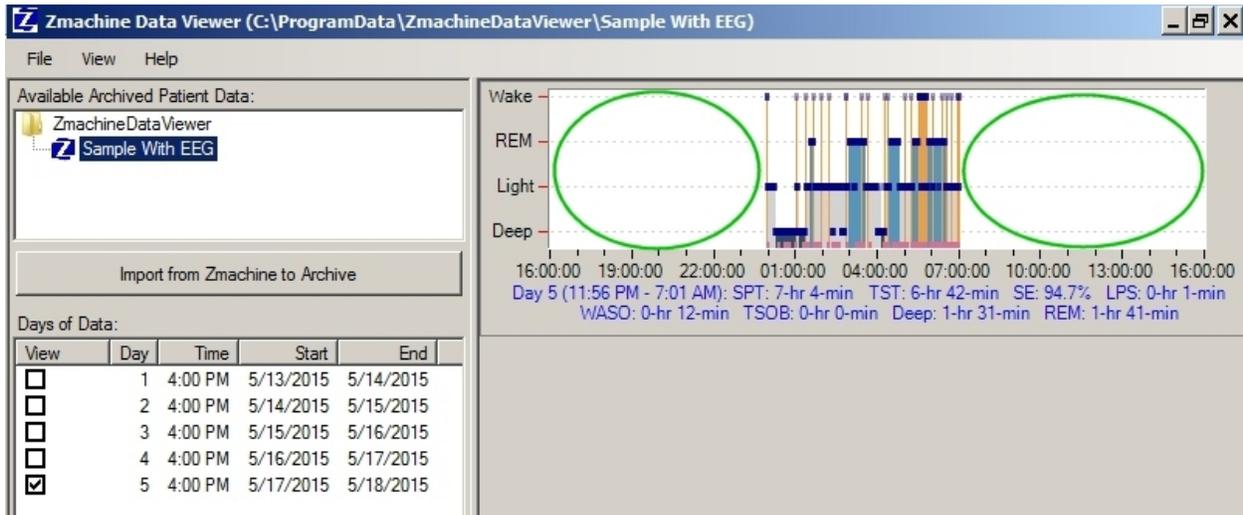
Day 3 (11:39 PM - 7:35 AM): SPT: 7-hr 56-min TST: 7-hr 35-min SE: 95.7% LPS: 0-hr 4-min
WASO: 0-hr 3-min TSOB: 0-hr 0-min Deep: 1-hr 8-min REM: 2-hr 48-min

Day 4 (12:55 AM - 7:25 AM): SPT: 6-hr 29-min TST: 6-hr 15-min SE: 96.4% LPS: 0-hr 2-min
WASO: 0-hr 2-min TSOB: 0-hr 0-min Deep: 1-hr 25-min REM: 2-hr 26-min

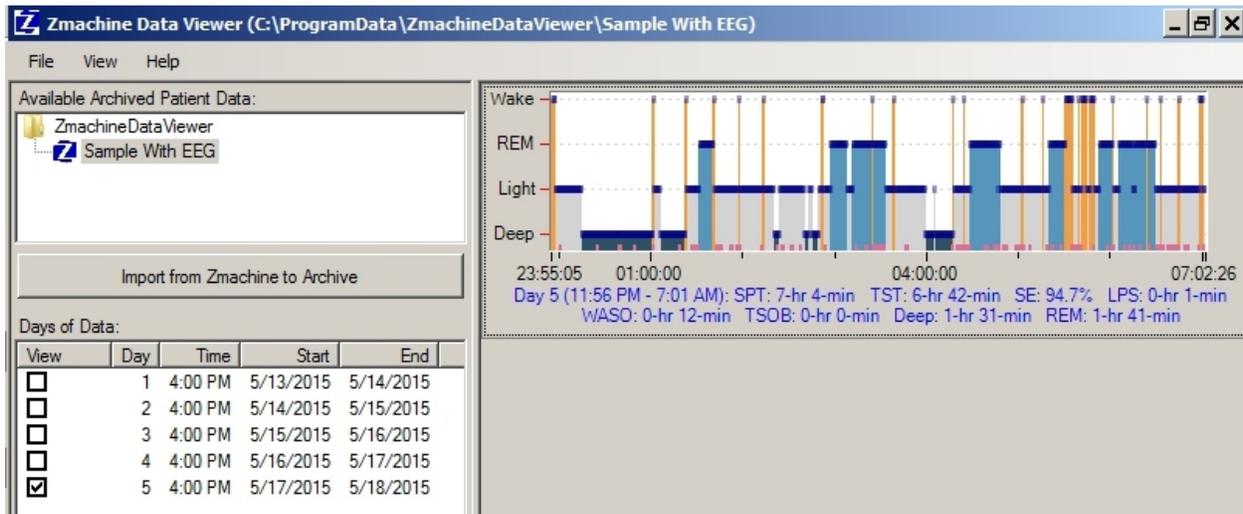
Day 5 (11:56 PM - 7:01 AM): SPT: 7-hr 4-min TST: 6-hr 42-min SE: 94.7% LPS: 0-hr 1-min
WASO: 0-hr 12-min TSOB: 0-hr 0-min Deep: 1-hr 31-min REM: 1-hr 41-min

Changing Views

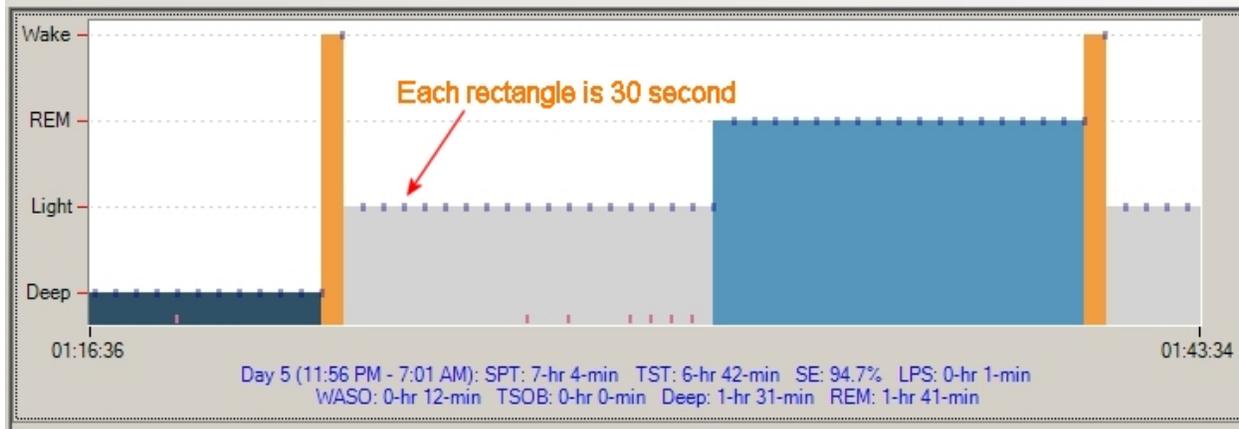
The display shows 24 hours per graph, but the Zmachine recorded data often occupies only a fraction of this space. The white space (circled) shows periods of time when the Zmachine was not recording any data.



To **completely fill the display area** with recorded data and eliminate the white space, simply **double-click** either of the white spaces.



To **zoom in**, simply hold the left mouse button and drag a rectangle. The data will be zoomed upon release. This process can be repeated as many times as needed. Zoom will reveal more detail, such as the solid blue line at the top of each graph actually being composed of individual 30 second markers, and the pink markers at the bottom of the graph indicating arousals.



To **zoom out**, simply click the right mouse button. Each right click will undo one zoom level. For example, if you zoomed into the data three times, you will need three right clicks to get back to where you started. Double-clicking the right mouse button will **return to the original view** in one step.

To **pan** across the data while maintaining the same zoom level, hold the Control key, click and hold the left mouse button, and drag mouse left or right to drag the data left or right.

To **measure time**, hold the Shift key, click and hold the left mouse button, and drag mouse left or right to measure the interval of time.

Viewing EEG Data

The EEG signal used to calculate each of the epoch scores can be displayed by selecting “Show Raw EEG Graph” in the Graph Options panel (arrow) and clicking on the epoch you wish to display within the Data Display Window. A vertical green bar will appear to indicate the interval of time being displayed. Sequential epochs can be displayed using left and right keyboard arrow keys.

The screenshot displays the Zmachine Data Viewer interface. On the left, the 'Available Archived Patient Data' section lists 'ZmachineDataViewer' and 'Sample With EEG'. Below this is an 'Import from Zmachine to Archive' button and a 'Days of Data' table. The 'Graph Options' panel at the bottom left has 'Show Raw EEG Graph' and 'Show Full Sleep Staging' checked, with a green arrow pointing to the former. The top right shows a sleep staging bar chart with a vertical green bar indicating the selected epoch. The bottom right shows the 'Raw EEG Data Starting 5/18/2015 4:03:34 AM' graph.

Available Archived Patient Data:

- ZmachineDataViewer
- Sample With EEG

Import from Zmachine to Archive

Days of Data:

View	Day	Time	Start	End
<input type="checkbox"/>	1	4:00 PM	5/13/2015	5/14/2015
<input type="checkbox"/>	2	4:00 PM	5/14/2015	5/15/2015
<input type="checkbox"/>	3	4:00 PM	5/15/2015	5/16/2015
<input type="checkbox"/>	4	4:00 PM	5/16/2015	5/17/2015
<input checked="" type="checkbox"/>	5	4:00 PM	5/17/2015	5/18/2015

Graph Options

- Patient Alert
- Sleep Maintenance Mode
- Patient Alert Delayed (Bonus Time)
- Session Start/Stop Lines
- Statistics exclude time out of bed
- Show Raw EEG Graph
- Show Full Sleep Staging

9:00:00 PM Bed Time
7:00:00 AM Wake Time

Wake
REM
Light
Deep

03:55:25 04:00:00 04:12:01
Day 5 (11:56 PM - 7:01 AM): SPT: 7-hr 4-min TST: 6-hr 42-min SE: 94.7% LPS: 0-hr 1-min
WASO: 0-hr 12-min TSOB: 0-hr 0-min Deep: 1-hr 31-min REM: 1-hr 41-min

Raw EEG Data Starting 5/18/2015 4:03:34 AM

Micro-Volts

75
50
25
0
-25
-50
-75

4:03:34 AM 4:03:40 AM 4:03:50 AM 4:04:00 AM 4:04:04 AM

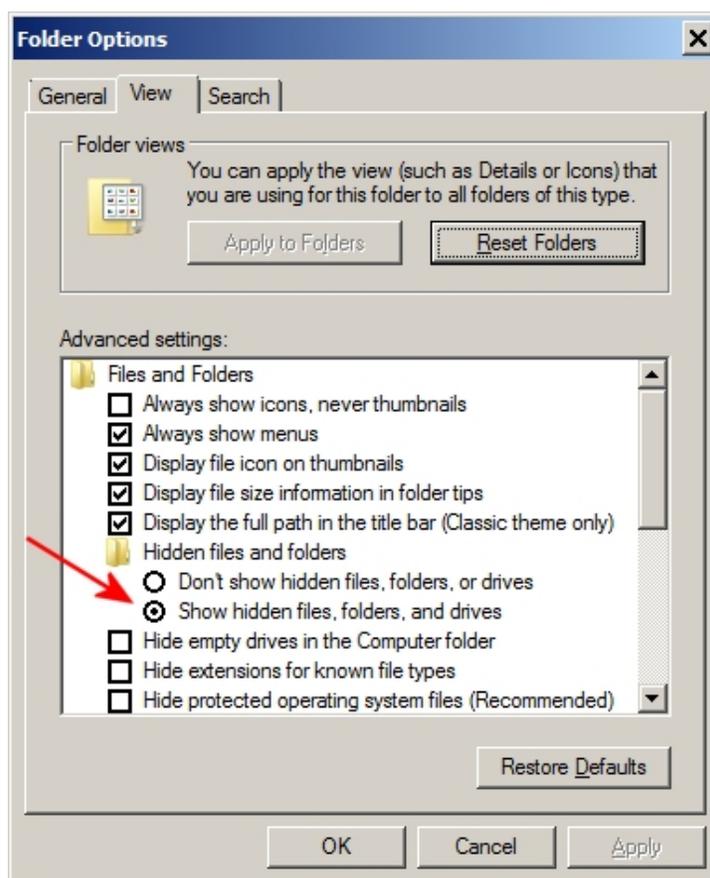
Location of Data Files

The default location of the imported files is:

“C:\ProgramData\ZmachineDataViewer\XXXXXXX\”

where “XXXXXXX” is the name that you selected when importing the data.

Note: “C:\ProgramData\” is a hidden folder by default, so you might need to turn on "Show hidden files, folders, and drives" in Windows in order to see this folder. Type “Folder Options” into the Windows search box and select the option as shown.



Tip: In the Zmachine Data Viewer, you can always use “File -> Change Archive Location” to change the file location to a folder that you prefer.