



SVSM Application Note 1500-008

Description of SVSM Measurement Data File Columns

The table below explains the meaning of each data column in a measurement data file generated by the SVSM system.

Column	Description
Comment	Any comments entered into the data file. Comments can be entered either directly using the Measure → Datafile Comment... menu entry or inside a sequence using the Measure Commands → VSM → Datafile Comment sequence command.
Time Stamp (sec)	The absolute time stamp for the current row of data. Timestamps can be converted into date & time values using the Utilities → Status Calculator menu item in MultiVu (enter the timestamp from the data file into the Time text field and click State? to convert the value).
Temperature (K)	The sample temperature for the current data row. This is the sample temperature, taking into account thermal history and current measurement options (e.g., it might be the temperature of the oven sample holder when performing measurements with the oven option active).
Magnetic Field (Oe)	The magnetic field for the current data row. This value takes into account current measurement options (e.g., field reported by the Ultra-Low Field Option).
Moment ⁱ M. Std. Err. ⁱ	Amplitude of the moment and associated standard error. Standard errors are only available when data has been collected for at least two vibration cycles.
Transport Action	1 VSM Measurement 2 Touchdown (auto) 3 Locate Scan (auto) 4 Locate Scan (user) 5 AC Measurement ⁱⁱ
Averaging Time (sec)	Requested averaging time as entered by the user.
Frequency (Hz)	Measurement frequency (frequency of the sample oscillation).

Column	Description
Peak Amplitude (mm)	Peak amplitude of the sample oscillation for the current data point. Actual value A returned from the lock-in measurement such that $z(t) = A \cdot \sin(\omega t)$
Center Position (mm)	Average position of the transport for the current data point. Position is reported in motor coordinates and does not reflect the sample offset position that is shown in the locate dialog.
Lockin Signal' (V) Lockin Signal" (V)	Raw in-phase and quadrature (out-of-phase) signals reported by the SQUID module. These values represent the uncorrected values without taking into account phase shifts introduced by the system. Values are reported as raw voltage multiplied by the SQUID range as reported in the next column (i.e., maximum reported value can be as high as 5000 in range 1000).
Range	Range setting of the SQUID module for the current data point. Possible values are 1, 10, 100, and 1000 (with 1 being the most sensitive setting).
M. Quad. Signal ⁱ	Quadrature (out-of-phase) component of the "Moment" column.
Diagnostic Items	
Min. Temperature (K) Max. Temperature (K)	Minimum and maximum sample temperature readings over the time required to measure the current data point. These values are especially useful when measuring while sweeping temperature as they give an indication about the temperature accuracy for the data point.
Min. Field (Oe) Max. Field (Oe)	Minimum and maximum sample field readings over the time required to measure the current data point.
Mass (grams)	Total mass of moving parts obtained from the dc component of the motor force. This includes the armature inside the linear motor, the sample rod, sample holder, and the sample itself.
Motor Lag (deg)	Phase lag between motor drive current and actual motor position.
Pressure (Torr)	Pressure inside the sample chamber for the current data point.

Column	Description
Measure Count	<p>Total number of waveforms used to calculate the current data point.</p> <p>This number indicates the quality of the data point – in perfect conditions, it should be <i>(Frequency x Averaging Time)</i> but can be reduced due to waveform rejection inside the SQUID module (e.g., SQUID resets occurring during the measurement).</p> <p>If the Measure Count drops below 50% of the expected value, the data point will be rejected and not logged in the data file.</p>
Measurement Number	Measurement repetition number for MvsH and MvsT measurements.
SQUID Status (code)	Internal status codes as reported by the SQUID module.
Motor Status (code)	Internal status codes as reported by the motor module.
Measure Status (code)	<p>0 OK</p> <p>1 SQUID voltage railed</p>
Motor Current (amps)	<p>AC component of the motor current.</p> <p>Value is proportional to the force required to achieve the requested vibration amplitude.</p>
Motor Temp. (C)	<p>Temperature of the heat sink inside the motor module.</p> <p>This temperature is used internally from the motor module to prevent damage to the module and the motor. If the temperature exceeds a maximum value, the motor will stop moving and an error will be logged into the event log.</p>
Temp. Status (code)	<p>Temperature status code as reported by the temperature control subsystem.</p> <p>Status codes can be translated into corresponding status text using the <code>Utilities → Status Calculator...</code> menu entry in MultiVu (enter the status code from the data file into the <code>Temp.</code> text field and click <code>State?</code> to convert the value).</p>
Field Status (code)	<p>Field status code as reported by the magnet power supply.</p> <p>Status codes can be translated into corresponding status text using the <code>Utilities → Status Calculator...</code> menu entry in MultiVu (enter the status code from the data file into the <code>Magnet</code> text field and click <code>State?</code> to convert the value).</p>
Chamber Status (code)	<p>Chamber status code as reported by the Gas handling controller.</p> <p>Status codes can be translated into corresponding status text using the <code>Utilities → Status Calculator...</code> menu entry in MultiVu (enter the status code from the data file into the <code>Chamber</code> text field and click <code>State?</code> to convert the value).</p>

Column	Description
Chamber Temp (K)	<p>Chamber temperature for the current data point.</p> <p>This value is the instantaneous temperature reported by the chamber thermometer on the sample tube and will be different from the sample temperature reported earlier as this does not take thermal history into account.</p> <p>When the oven option is active, the chamber temperature should be stable at about 280 K and can be used to diagnose oven performance issues.</p>
Redirection State	<p>0 No redirection</p> <p>1 Oven option active and controlling temperature</p>
Map 01 ... Map 16	<p>Mappable data columns (varying content).</p> <p>Additional data columns available for logging advanced diagnostic data (see section B.3.3 in the SVSM User Manual). Actual column titles in the data file will reflect the data being recorded when the data file was first created.</p>

Table A-1. Standard measurement file data columns, shown in the order they appear

ⁱ Units depend on user selection – “emu” or “Am²” based on selection in “Measure” menu

ⁱⁱ If AC option is installed