

spotWave Software Operation Manual

Operation Manual



Revision 2022-07

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1. spotWave Software Operation Manual

This operation manual applies to the data acquisition software of the spotWave model 201 device with input ranges of 94 dB_{AE}, 100 dB_{AE} and 134 dB_{AE}.

Read the operation manual before the first use of the product in order to avoid operating errors. Acquisition software operating errors can compromise the quality of measurement data and subsequent data analysis. Operating errors of the acquisition software do not affect or harm the hardware functions of the spotWave device.

1.1. Original Instructions

The original instructions are written in English language and are verified by Vallen Systeme GmbH.

1.2. Information Provided in the Manual

The information provided in the operation manual shall enable an operator to obtain, install and run the spotWave Acquisition software (in accordance with the EULA), to use the spotWave Acquisition software for configuring the spotWave device and for saving measurement data to the hard disk drive.

1.3. Information Provided in Other Resources

The *spotWave Instructions Manual* describes the hardware features of the spotWave device and gives instructions that enable an operator the correct way of storing, transporting and installing a spotWave device.

The technical specifications of a spotWave device are summarized in the *spotWave Device Specification*.

Accessories such as cables, sensors, magnetic holders, etc. are specified and described in the according data sheets and summarized in the *Accessories for Acoustic Emission Systems* document.

1.4. Intended Audience

This operation manual is intended for qualified personnel. Qualified personnel have one or more of the listed characteristics:

- have an appropriate technical education
- can recognize the safety of a spotWave device
- have been trained to operate a spotWave device
- hold a valid certification according to ISO 9712, ASNT or any other comparable standard or standardization organization

Furthermore, such personnel know regulations concerning employment protection and on-the-job safety.

2. Contact Information

Vallen Systeme GmbH is the manufacturer of Acoustic Emission measurement systems and accessories for acoustic emission testing.

```
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```

Information about Vallen Systeme GmbH and the products can be found at www.vallen.de

3. Regulatory Information

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4. Software and Firmware Updates

Vallen Systeme GmbH releases software updates including new firmware for its measurement devices to (i) add new features, (ii) include product enhancements and (iii) fix software issues. The latest software release can be obtained from www.vallen.de/downloads.

5. Differentiation of Terms

spotWave

spotWave is a trademark of Vallen Systeme and the type designation of a single channel AE measurement system that can be operated by a mobile device or a PC. It has a USB interface for communications and power supply. Measurement data is stored to the host device to a *.pridb and *.tradb file.

linWave

linWave is a trademark of Vallen Systeme and the type designation of a dual-channel AE measurement system that can be integrated into an existing LAN infrastructure. The measurement data is collected over the LAN interface by an acquisition software that is running on a host device.

conditionWave

conditionWave is a trademark of Vallen Systeme and the type designation of a dual-channel AE measurement system that can be integrated into an existing LAN infrastructure and a machine monitoring environment. It receives commands via an API.

Measurement device vs. measurement system

A spotWave-, linWave- or conditionWave measurement system consists of the measurement device, an AE sensor, and an end device (such as a PC, laptop, mobile device, etc.) as well as all necessary accessories for conducting a measurement such as cables, holders, etc. The measurement device is the box or chassis which holds the signal processor and logic. It is labeled accordingly as spotWave-, linWave- or conditionWave device.

The Vallen AE Suite software

The Vallen AE Suite software is the ecosystem of software and programs that is published by Vallen Systeme. The programs interact with the hardware of Vallen Systeme for verification, configuration and data acquisition purposes as well as provide means for data analysis and visualization.

6. General Information about the Usage

The spotWave Acquisition software can only be used together with a spotWave device. A spotWave device needs to be connected to the acquisition PC in order that the acquisition software can be operated beyond the point of just starting it. The acquisition software cannot be used with any other device.

The spotWave Acquisition software can be used to detect and select a spotWave device that is connected to the acquisition PC.

The spotWave Acquisition software can be used to configure the spotWave device for data acquisition. Data acquisition can be done in *Recording* mode (default) or *Logging* mode.

The *Recording* mode requires a PC which runs the spotWave Acquisition software. In this measurement mode the acquisition software polls measurement data from the selected device and saves it to the hard disk drive of the PC. The spotWave Acquisition software can be used to visualize the measurement data on a display that is connected to the PC.

In *Logging* mode, the spotWave device can run autonomously, without the need of a PC and a running instance of the spotWave Acquisition software. The measurement data is written to the internal memory of the device. The spotWave device will run in *Logging* mode until memory is full, power is cut for longer than 30 minutes or until terminated by the user through the spotWave Acquisition software.

A laptop, tablet device or mobile device running Windows OS can be used instead of a PC for running the spotWave Acquisition software

6.1. Intended Use

The spotWave Acquisition software is intended to be used in the above-mentioned way. Any other way of using it is not supported and does not work.

The spotWave Acquisition software and the device itself shall only be used by qualified personnel. A definition of qualified personnel can be found in the section Intended Audience.

7. Reasonably Foreseeable Misuse

The spotWave Acquisition software cannot be used for analyzing the measurement data. For analyzing measurement data, the Vallen VisualAE program is needed.

The spotWave Acquisition software cannot be used for controlling and operating a linWave- or conditionWave device.

The spotWave Acquisition software cannot be used for controlling and operating an AMSY-6 measurement system.

8. Obtaining and Installing the spotWave Acquisition Software

The spotWave Acquisition software is part of the Vallen AE Suite software. It can be obtained via download from www.vallen.de/downloads.

The spotWave Acquisition software can be shipped on a USB flash drive as part of a spotWave device.

8.1. Installation

The installer file (AESuite.msi) is located on the USB flash drive or in the zip container if it was downloaded from the Vallen Systeme website.

The installer needs to be executed in order to start the installation routine.

After accepting the EULA the files of the Vallen AE Suite software are copied to the local hard disk drive. The installation folder cannot be changed and is going to be `c:\Vallen`. The spotWave Acquisition program is going to be located in `c:\Vallen\spotWave`

After finishing the software installation, the Vallen Control Panel is started and the user is prompted to provide a KeyFile for activating the software (see figure 1). Select the Key option *Use free ("lite") installation* if a KeyFile is not available. Select the Key option *Use existing (active) key* if a KeyFile has been installed on the PC previously. Select the Key option *Choose a key file* if an up-to-date KeyFile is available.

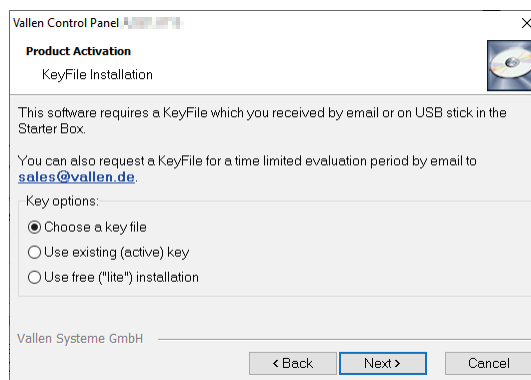


Figure 1: Product Activation dialogue of the Vallen AE Suite software. Select "Choose a keyfile" or "Use existing key" if an up-to-date KeyFile is available or has been installed. If no KeyFile is available, choose the "Use free ("lite") installation".

Please note, that a KeyFile is not required for using the spotWave Acquisition program.

The *free ("lite") installation* is not protected by a KeyFile and grants the user the right to use the installed software programs which are limited in their capabilities to purposes of visualizing measurement data only. Any data processing capabilities are disabled.

A Vallen AE Suite software installation that has been activated with a KeyFile offers data processing capabilities next to analysis capabilities.

Please pick up contact with our representative for your country or with Vallen Systeme directly if you want to extend the free-to-use VisualAE program.

8.2. Checking the Correct Installation

Connect the spotWave device to the PC, laptop or any other end device running a Windows OS, for checking that the installation was performed correctly. After the spotWave device was recognized by the Windows

operating system start the device manager by typing *Device Manager* in the search box on the taskbar, then select this item from the menu.

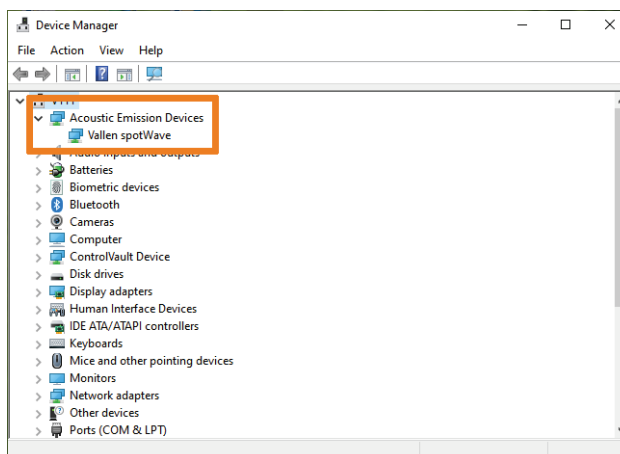


Figure 2: screenshot of the device manager. After a correct installation of the software and drivers the spotWave device is recognized as an Acoustic Emission Device of type Vallen spotWave.

The spotWave device is recognized as *Vallen spotWave* in the section *Acoustic Emission Devices* if drivers have been installed correctly (see figure 2).

8.3. Enabling UART Protocol

The spotWave device can be addressed over the Windows driver, which is installed by default. This can be recognized by the fact that the spotWave device is registered under the section Acoustic Emission Devices in the Device Manager (see figure 2).

Instead of using the Windows driver the generic UART protocol can be used to address the spotWave device. For communicating with the spotWave device over the UART protocol the Windows driver needs to be uninstalled and the driver software needs to be deleted from the PC by the use of the Device Manager.

Notice

Use the Windows Driver

It is recommended to use the Windows driver when operating the spotWave device with the Vallen spotWave Acquisition software. Only use the UART protocol if instructed by Vallen Systeme to do so.

After the Windows driver has been removed, the spotWave device is going to show up as a Communication Port (COM X) device in the section Ports (COM & LPT) of the Device Manager.

9. Operating the spotWave Acquisition Software

The location of the spotWave Acquisition program is `c:\Vallen\spotWave\spotWaveAcq.exe`.

The software is started by running the `spotWaveAcq` program (`spotWaveAcq.exe`). This can either be done from the command prompt, the file explorer or the *Vallen Control Panel*.

9.1. Firmware Version Check

The firmware version of the connected spotWave devices is checked after starting the acquisition software. A firmware revision mismatch, meaning that the acquisition program expects a different firmware version than what is installed on the spotWave device, will start the firmware update program. In such a case follow the instructions of the pop-up dialogues in order to install the expected firmware files. Pick up contact with Vallen Systeme if in doubt of what to do.

9.2. The States of the Acquisition Program

The spotWave acquisition program has got three states, (i) setup, (ii) data acquisition and (iii) pause state.

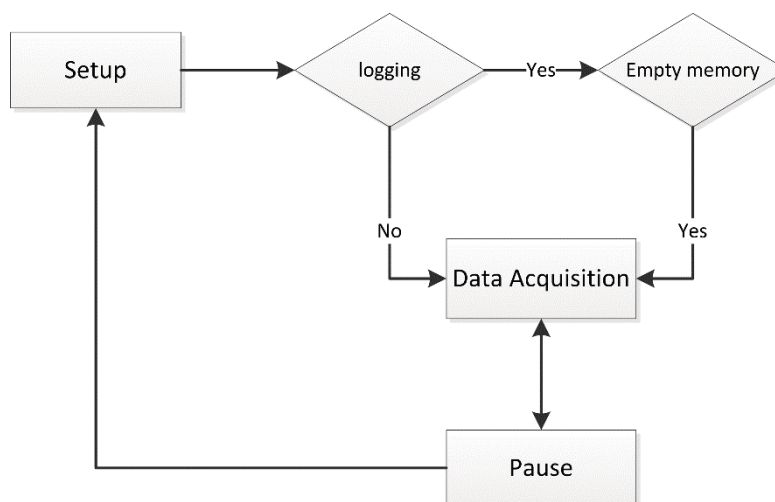


Figure 3: software states of the spotWave Acquisition program.

9.3. The Acquisition Program – Setup State

In setup state the spotWave device can be configured for data acquisition. The data acquisition is inactive and no data is written to the hard disk drive while the device is configured.

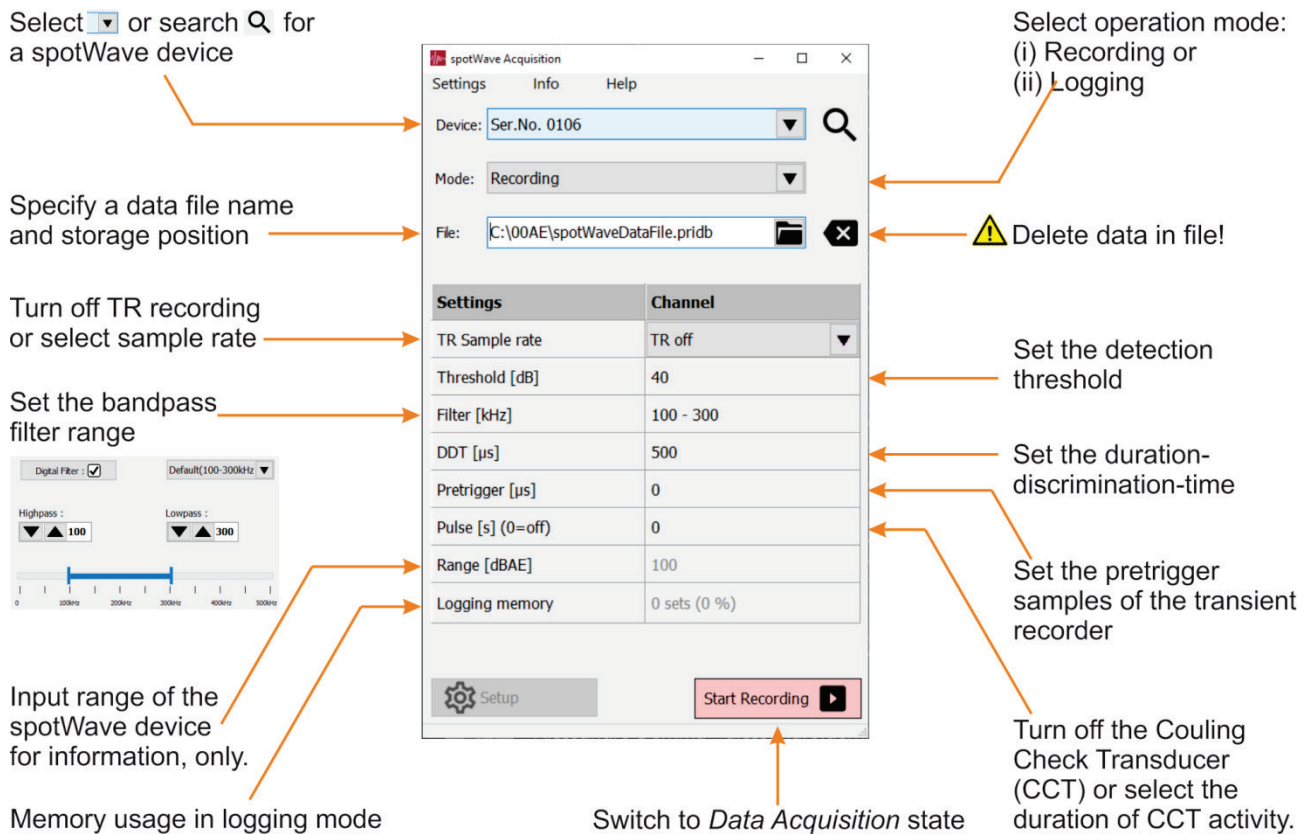


Figure 4: setup dialogue of the spotWave acquisition software.

9.3.1. Device

The drop-down list (inactive) shows the serial number of the selected device. In active state the drop down list shows a list of spotWave devices that are connected to the acquisition PC. Each spotWave device is identified by its serial number. Clicking a spotWave device from the list selects it and puts the drop-down list into inactive state, again.

If the wanted spotWave device is not listed, the USB ports can be polled by clicking the magnifying glass icon.

9.3.2. Mode

The drop-down list (inactive) shows the selected operation mode. It can be (i) *Recording* or (ii) *Logging*. The default operating mode is *Recording*.

The recording mode requires an acquisition PC and a running instance of the spotWave acquisition program. In *Recording* mode measurement data is polled from the device and written to a *.pridb and *.tradb file that resides on the hard disk drive of the acquisition PC. In parallel the measurement data can be visualized by either the in-built diagram or the VisualAE program.

The *Logging* mode does not require an acquisition PC nor a running instance of the spotWave Acquisition program. Instead of the acquisition PC a USB power bank is needed for supplying power to the spotWave device. In this operating mode the measurement data is written to the device's memory. When the spotWave acquisition software is put in logging mode, data can be downloaded from the device's memory (download button) or data can be deleted from the device's memory (backspace button)



Figure 5: Logging mode with possible actions of downloading data from the device and deleting the data on the device

Clicking the download button (see figure 4) opens a standard Windows File Save As dialogue in which the user can specify the storage location and file name of the data file. Upon downloading the data from the device's memory, a well formed pridb-file is generated.

Notice

Logging Mode Supports Only Hit Feature Data

The transient recorder is disabled in logging mode. Only hit feature data is stored to the internal memory. Waveform data is not stored.

Loss of Measurement Data

Clicking the backspace button deletes the data on the device after a confirmation pop up. Data that is deleted from the device cannot be recovered from the device. Data needs to be downloaded before deleting it in order to get a back-up copy of it.

Starting Logging Mode Needs Empty Memory

In order that the recording can be started in *Logging* mode, the device's memory needs to be empty. As long as there is still data in the device's memory the *Logging* mode cannot be started.

9.3.3. File

A text field for (i) specifying the path and file name of the data file to which data is written or (ii) showing the selected file and its storage location.

The folder icon can be clicked and calls up a standard Windows file selection dialogue.

The backspace icon can be clicked for deleting the measurement data in the selected file. After a confirmation dialogue the data in the pridb-file and the tradb-file with the identical file name is deleted.

Notice

Loss of Measurement Data

Clicking the backspace button deletes the data of the *.pridb and *.tradb file after a confirmation pop up. Data that is deleted from the files cannot be recovered. Make sure to have a backup of the data before deleting it.

9.3.4. TR Sample rate

The drop-down list displays the selected sample rate for saving transient recorder data in inactive state. Once activated it shows a list of sample rates for saving transient recorder data. Sample rates can be (i) 2 MHz, (ii) 1 MHz, (iii) 500 kHz (iv) 200 kHz. The fifth option, *TR off*, disables the transient recorder.

The TR sample rate has a direct influence on the size of the transient data file. The higher the sample rate, the more data is written to the transient data file. Let f_{sp} be the sample rate (in Hz) and D the duration of the burst signal (in seconds) then the data size in bit is M :

$$M = 16 \times f_{sp} \times D$$

9.3.5. Threshold

A field that displays the detection threshold (40 by default) in units of dB_{AE}. A burst signal, which intensity exceeds the detection threshold triggers a measurement. A measurement creates a data set, which properties are written to the data file. Signals below the detection threshold are not measured and thus do not trigger the generation of a data set.

Clicking the field activates a numerical up/down control. The appropriate detection threshold in units of dB_{AE} can be typed into the field or adjusted by the up/down arrows.

9.3.6. Filter

A field that displays the selected band pass filter. Clicking on it calls up the pass band filter selection dialogue (see figure 3)

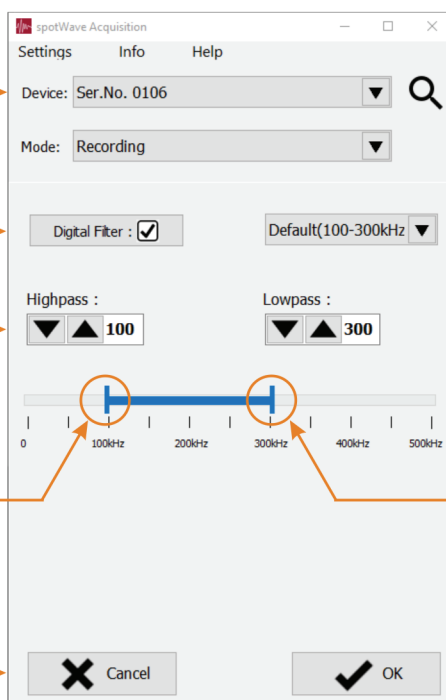
Select or search for a spotWave device

Enable the application specific band pass filter

Set the hi-pass cut-off

Set the hi-pass cut-off by dragging the end marker

Discard changes and switch to the setup dialogue



Select operation mode:
(i) Recording or
(ii) Logging

Select a bandpass filter from a predefined filter list

Set the lo-pass cut off

Set the lo-pass cut-off by dragging the end marker

Confirm settings and switch to the setup dialogue

Figure 6: pass band filter selection dialogue

The operator can enable or disable the digital pass band filter (also called application specific pass band filter). Four pass band filters are predefined (1) Low from 10 kHz to 100 kHz, (2) Default from 100 kHz to 300 kHz, (3) High from 300 kHz to 500 kHz and (4) Wide from 10 kHz to 500 kHz).

Each of the predefined filters can be adjusted by specifying a highpass and a lowpass frequency. The cut off frequencies can either be typed into the appropriate fields or adjusted by the use of the slider control element.

9.3.7. DDT

A field that displays the duration discrimination time in units of μs (500 by default). The duration discrimination time is used in a criterion that separates individual burst signals from each other. A new burst signal is recognized if a threshold crossing has not been detected for the time span of the duration discrimination time or longer.

Clicking the field activates a numerical up/down control. The appropriate duration discrimination time in units of microsecond can be typed into the field or adjusted by the use of the up/down arrows.

9.3.8. Pretrigger

A field that displays the length of the pretrigger in units of μs (0 by default). The pretrigger defines a time span for which waveform data is recorded prior to the trigger (which is the first threshold crossing). Waveform data from the pretrigger and the burst signal are saved together as one data set to the transient data file (tradb).

Clicking the field activates a numerical up/down control. The appropriate pretrigger length in units of microsecond can be typed into the field or adjusted by the up/down arrows.

9.3.9. Pulse

A field that displays the repetition period in units of seconds for a 3.3 V flank of a rectangular signal with DC offset of 1.65 V. The default value of 0 disables the pulse function. The signal is put out over the socket labelled CCT on the device.

Clicking the field activates a numerical up/down control. The appropriate repetition period in units of seconds can be typed into the field or adjusted by the up/down arrows.

For example, a setting for the repetition period of 5 s is producing a rectangular signal that exhibits a rising or falling flank every 5 seconds.

The indirect piezoelectric effect causes a mechanical excitation of the piezoelectric element in the so-called coupling check transducer upon each flank of the rectangular signal. This in turn generates an elastic wave. Tracking the response of the AE sensor to the elastic wave allows to evaluate the coupling quality of the AE sensor over time. This procedure is termed *coupling check* and the transducer connected to the CCT socket is termed *coupling check transducer* (CCT).

9.3.10. Range

A field that displays the input range of the spotWave device. This can be 94 dB_{AE}, 100 dB_{AE} or 134 dB_{AE}. It specifies the maximum output intensity of a sensor that does not drive the spotWave device into saturation.

9.3.11. Logging memory

The device's memory needs to be empty in order that the recording can be started in logging mode. Refer to section 10.3.2, Mode, for instructions of how to download data from the device's memory and of how to empty the memory. See the specification data sheet of your device for the size of the logging memory.

9.3.12. Start Recording

Clicking the button switches the acquisition software to recording state.

In Logging mode, the button is labelled *Start Logging*.

9.4. The Acquisition Program – Recording State

In the *Recording* state, the acquisition programs polls measurement data from the device and writes it to the hard disk drive. Additionally, it displays the measurement data in a simple AE diagram or it displays the transient data in a transient recorder diagram.

9.4.1. Label

A test field that allows the user to enter a string. Upon clicking the send button, the string is inserted into the time stream of the data as a label data set.

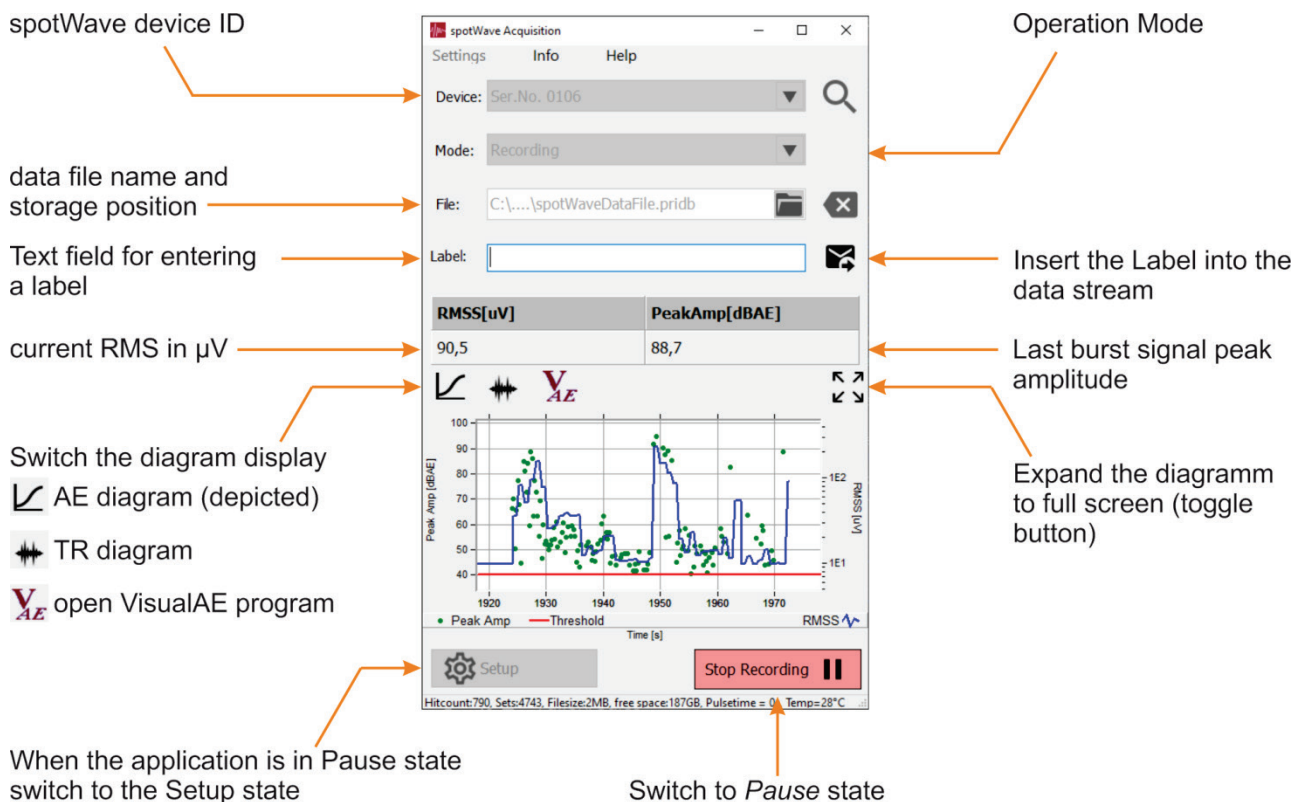


Figure 7: data acquisition state of the spotWave acquisition software

9.4.2. RMSS

A field that displays the RMSS of the AE signal in units of micro Volt.

9.4.3. PeakAmp

A field that displays the peak amplitude of the last hit in units of dB_{AE} .

9.4.4. Diagram Buttons

The diagram pane of the acquisition program can display an AE diagram or a transient recorder diagram.

The AE diagram shows the peak amplitude (left vertical axis) of hits as green rectangular symbols over time (each hit represented by a single symbol) and the RMSS (right vertical axis) as blue graph. Additionally, a red horizontal line indicates the detection threshold.

The transient diagram shows the sampled waveform of the last measured hit.

9.4.5. Expand Button

The expand button expands the diagram to full screen. It has got a toggle-function, thus minimizing the window again upon clicking it a second time.

9.4.6. Stop Recording

Clicking the button puts the acquisition software in pause state. In this state no data is recorded and written to the hard disk file. From this state a switch to the setup state or the recording state is possible.

In logging mode, this button is labelled *Stop Logging*.

9.4.7. Setup

This button is inactivated in data acquisition state but clickable in pause state. Clicking it puts the acquisition software in setup state.

9.5. The Acquisition Program – Pause State

In Pause state the dialogue of the acquisition program is the same as in data acquisition state. All inactivated fields of the data acquisition state, such as Device, Mode and File and the Setup button are active again.

10. Measurement Results

A spotWave device provides the measurement results described in subsequent sections.

The identifiers of the measurement results are capitalized and refer to the names as used in the VisualAE program.

HITS: Hits

HITS has the value of 1 in each hit data set.

HITS can be used for plotting histograms and activity plots.

CHAN: Channel Number

CHAN is the logical number of the channel that has produced the data set. For a spotWave device the channel number is 1.

TS: Arrival Time

TS is the time measurement in seconds of the first threshold crossing of a burst signal. *TS* starts off with value of 0 at the start of the measurement. The resolution of *TS* is given by the clock of the measurement device.

A: Burst Signal Peak Amplitude

A is the burst signal peak amplitude in units of dB_{AE}. *A* is derived from the peak amplitude measurement in μV.

$$A = 20 \cdot \log(ALIN)$$

ALIN: Burst Signal Linear Peak Amplitude

ALIN is the burst signal peak amplitude in μV. The resolution of *ALIN* depends on the input range of the measurement channel. Standard input range settings are 94 dB_{AE} or 50 mV_{pk}, 100 dB_{AE} or 100 mV_{pk} and 134 dB_{AE} or 5 000 mV_{pk} for which the amplitude resolution is approximately 1.52 μV, 3.05 μV and 152.59 μV, respectively.

THR: Detection Threshold

THR holds the value of the detection threshold in units of dB_{AE} that was valid at the time when the data set was generated. A data set is generated either with the first threshold crossing (hit) or on time triggered basis in case of status data sets.

E: Burst Signal Energy

E corresponds to the signal energy of the burst signal scaled to the arbitrary unit of eu. The signal energy is the sum of squared voltage samples (u_i) starting with the sample of the first threshold crossing ($i=1$) up until the sample with which the Duration Discrimination Time (*DDT*) expired ($i=N$):

$$E = \Delta t \sum_{i=1}^N u_i^2$$

Δt refers to the time difference between two consecutive voltage samples. From a mathematical standpoint the conversion to a true energy (*TE*) is done the following way:

$$TE = \gamma \frac{1}{R} E$$

Whereby γ corresponds to the conversion factor of eu to J and R to an ohmic resistance with

$$\gamma = 10^{-14} \text{ V}^2\text{s/eu}, R = 10 \text{ k}\Omega$$

The ohmic resistance is dependent on the input impedance of the devices input. As the input impedance changes, the true energy result will change as well. Since the division by the resistance is a scaling factor, it is recommended to use the arbitrary energy units and omit the conversion to engineering units.

R: Burst Signal Rise-time

R is the burst signal rise time in units of μs and corresponds to the difference of the time of occurrence of the peak amplitude (T_A) to the first threshold crossing (TS).

$$R = T_A - TS$$

The time resolution of the rise time measurement depends on the clock.

D: Burst Signal Duration

D is the duration of a burst signal in μs and corresponds to the time difference of last threshold crossing and first threshold crossing.

$$D = T_{DDT} - TS - DDT$$

Whereby T_{DDT} is the time when the *DDT* expired. The time resolution of the duration measurement depends on the clock.

CNTS: Ring Down Count

CNTS is the number of positive threshold crossings up until the duration discrimination time expired (T_{DDT}).

THRS: Detection Threshold of Status Data Set

The valid detection threshold is assigned to *THRS* and forms part of the status data set.

ENYS: Energy of a Status Data Set

ENYS is the signal energy accumulated over a time interval of one second.

$$ENYS = \Delta t \sum_{i=1}^M u_i^2$$

whereby

$$M \cdot \Delta t = 1 \text{ s}$$

RMSS: rms of a Status Data Set

RMSS is the root mean square of the signal voltage over the time interval of one second. *RMSS* is given in units of μV . It is calculated from the *ENYS* result and assigned to a status data set.

$$RMSS = \sqrt{\frac{1}{M} ENYS}$$

RMS: rms of a Hit Data Set

RMS is the last *RMSS* result. The result is assigned to a hit data set.

DSET: Data Set Number

DSET is the unique id in from of a number of a data set (hit data, parametric data, status data and label data set)

LABL:

LABL is the *DSET* result of the last label that has been inserted into the time stream of the measurement data.

TRAI: Transient Recorder Index

The Transient Recorder Index is a unique number that identifies the transient recorder data belonging to a hit. A *TRAI* will be generated only if the transient recorder is triggered for recording.

PA0: temperature of device

PA0 is the temperature of the device in degree centigrade.

TOAB: Time-out Aborted Signal Flag

A *TOAB* of one indicates that hit processing was terminated after a time period of 100 ms and a hit data set was generated without detection of the hit's end. The hit processing is continued until the end of the hit is detected. A subsequent hit is artificially started and receives an *ATOA* flag.

A listing in VisualAE is going to print a *T* in the flag section if *TOAB* is set to one.

ATOA: After Timeout Signal Flag

A *ATOA* of one indicates that the previous hit's *TOAB* was one. The flag indicates an artificially started hit after hit time-out (see above).

A listing in VisualAE is going to print an *A* in the flag section if *ATOA* is set to one.

DTOS: DDT Too Short

DTOS is set to one if the hit termination criterion (expiry of a time period of length *DDT* without any threshold crossings) is disabled. The hit termination criterion can be disabled by the measurement system if the internal buffers are running full. This can happen if the hit rate exceeds the hit processing capabilities of the measurement device.

This special state is resolved to normal state once internal buffers are emptied to a certain level (device dependent).

The reason for a situation when the hit termination criterion is disabled can be a *DDT* setting that is too short for the circumstances of the measurement.

A listing in VisualAE is going to print a *D* in the flag section if *DTOS* is set to one.

CAL2: Coupling Pulse (Sent)

CAL2 is set to one if the measurement device produces a pulse.

A listing in VisualAE is going to print a *C* in the flag section if *CAL2* is set to one.

SATR: Saturation of Measurement Chain

SATR is set to one if a sample's amplitude exceeded 95% of the input range.

A listing in VisualAE is going to print an *S* in the flag section if *SATR* is set to one.

11. spotWave Software Extension

The VisualAE program with a *Lite* license can be used for visualizing measurement data in a more convenient way than through the spotWave Acquisition software. With the *Lite* license the VisualAE program is free-to-use.

For analyzing measurement data, a version of the VisualAE program is needed that is extended by analysis capabilities. Please pick up contact with your representative or with Vallen Systeme if an upgrade of the VisualAE program is needed.

The Vallen VisualAE program can be obtained from the download page <https://www.vallen.de/downloads/> and is contained within the current version of the Vallen AE Suite software.

12. END-USER LICENSE AGREEMENT (EULA) FOR THE VALLEN AE SUITE SOFTWARE

Last Updated: June 2022

12.1. IMPORTANT - READ CAREFULLY

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Vallen Systeme may collect, use and transfer machine specific data during SOFTWARE PRODUCT activation. Information collected will be machine specific and will be used for activation of the related SOFTWARE PRODUCT and SOFTWARE PRODUCT license validation.

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Performance benchmarks are defined for the system without background programs running. In case that any background programs or services, such as antivirus, screen saver, backup service or other similar tasks, are installed, the user must expect a performance drop of the system.

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License transfer needs the written permission of Vallen Systeme.

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This EULA runs for an indefinite period of time.

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Vallen Systeme GmbH is not liable for damages of any kind to the extent of applicable law, as far as such damages are not due to an intentional or grossly negligent behavior of Vallen Systeme. In no event Vallen Systeme shall be liable for lost profits, consequential, indirect or incidental damages (including, but not limited to loss of use, loss of data or business interruption). The statutory period of limitation for the judicial assertion of claims for damages shall be shortened to 2 years.

12.9. DATA PROTECTION

The data protection notice from Vallen Systeme with all information on data protection is made available to you separately. Further information is also available at <https://www.vallen.de/datenschutz/>. At your request, the data protection notice will be sent to you again by post or by E-Mail.

12.10. MISCELLANEOUS

- a. Place of performance shall be the corporate seat of Vallen Systeme GmbH, in Wolfratshausen/Germany.
- b. The exclusive place of jurisdiction for disputes resulting from or in relation to this EULA shall be Munich, Germany. Vallen Systeme is also entitled to bring the matter before the court at the corporate seat of the licensee. The governing law shall be the law of the Republic of Germany excluding the conflict of law rules and the UN Convention on Contracts for the International Sales of Goods (CISG).
- c. If any terms and/or clauses of this EULA are invalid or become invalid, the validity of all other terms and/or agreements shall not be affected. Invalid or absent clauses shall be replaced by valid clauses which constitute the economic intent of the parties.
- d. Vallen Systeme reserves the right to change any of the terms and conditions contained in this EULA at any time and in its sole discretion. When changes are made, Vallen Systeme will revise the "Last Updated" date at the top of this EULA.
- e. In Addition to this EULA, the General Terms and Conditions of Vallen Systeme, available at <https://www.vallen.de> apply

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