AVANTES USA
MEMBER OF THE NYNOMIC GROUP

SPECTRAL TIPS AND TECHNIQUES:

EXTERNAL TRIGGERING: AVATRIGGER

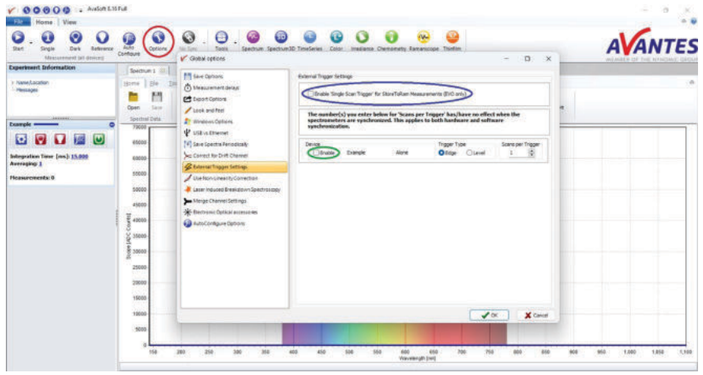
INTRODUCTION AND STEPS

While many spectroscopic applications and measurement techniques utilize a single or continuous measurement mode for our spectrometers, some applications require the spectrometer to take measurements at precise times, such as certifying solar simulators or laser-induced breakdown spectroscopy. In these instances, it is most ideal for the spectrometer measurements to be triggered by an external source. To fulfill this need, Avantes offers an external trigger source, known as the AvaTrigger, that can be easily connected to all our spectrometer product lines and send an external trigger source either by pushing a button or by reading an optical flash. Below is a short guide covering the functionality of the AvaTrigger and its use with the External Triggering setting in AvaSoft.

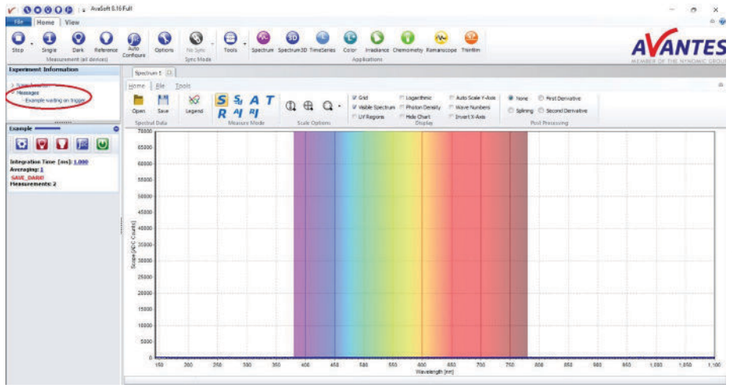
Setting up the AvaTrigger requires the spectrometer and the AvaTrigger to be connected via an interface cable. An interface cable for our ULS2048CL and any other unit that uses the AS7010 electronics board, such as the Varius™, is included with the AvaTrigger, but interface cables for our other spectrometers, such as the Nexos™, are available upon request. A picture of an example setup is shown below.

As mentioned, the AvaTrigger has multiple trigger options. The rightmost position is the "Manual" mode, which allows the AvaTrigger to send a TTL signal out to the connected spectrometer every time the left button is pushed. The leftmost position is the "Opto" mode, which allows the AvaTrigger to send a TTL signal out every time a strong enough optical trigger is received by the photodiode located in the SMA port on the right. The AvaTrigger can either be mounted to align the SMA port directly with the optical trigger, or a fiber optic cable can be utilized to direct light into the AvaTrigger. If a fiber optic cable is used, it is important to use a sufficiently large core diameter as well as a collimating lens as the end of the fiber to capture the necessary amount of light. If the sensitivity of the AvaTrigger optical trigger is too strong (it is set to maximum sensitivity by default), please return the AvaTrigger to Avantes to have this sensitivity adjusted. In the "Off" position, no signal will be sent for measurements. This position can be useful if the user wants to stop sending TTL signals to the spectrometer, but the environment might have optical flashes that could be read as an optical trigger.

With the setup complete, we can enable external triggering for the spectrometer in AvaSoft and use it in conjunction with the AvaTrigger. To enable external triggering, open the global options (circled in red to the right), navigate to the External Trigger Settings section, and check off the "Enable" box in the device portion (circled in green). The external trigger function can also be used with the StoreToRAM function (covered in a previous guide), and the trigger functionality can be adjusted with EVO electronics board to a "single scan trigger" mode by checking the respective "Enable" box (circled in blue above). This function will be discussed later, but should not be enabled by default.

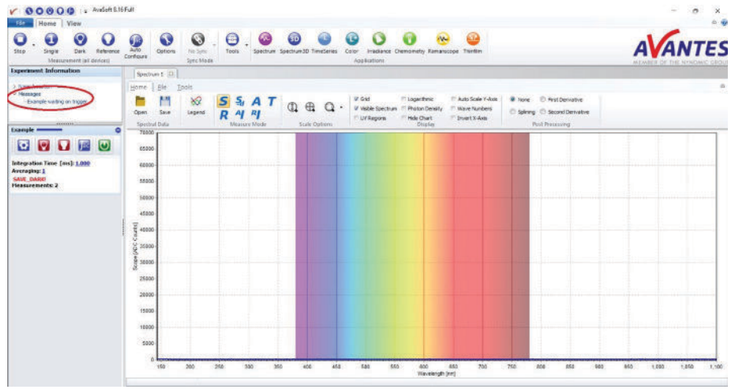


With external triggering enabled, click OK and begin measurements. You will notice that the measurement counter will not increase unless an external trigger is received by the spectrometer. An additional indicator of this will be a short message in the upper right corner of the AvaSoft window that reads "waiting on trigger" (circled in red below).



It should be noted that with external triggering enabled, dark and reference measurements cannot be easily saved in AvaSoft. It is recommended to take these measurements with external triggering disabled. Additionally, it is important to note that the spectrometer will only read an incoming TTL signal once a measurement is complete. Therefore, you cannot set the external triggering to a rate that is faster than the total measurement time for one scan from the spectrometer. This includes the integration time, number of averages, and any delays from data transfer speed. For the last category, the specifics for each spectrometer model can be found in the Avantes catalog or on our website.

As mentioned previously, the external trigger function can be used in conjunction with the StoreToRAM function. By default, a single external TTL signal will trigger the spectrometer to take the set number of StoreToRAM measurements in one batch. For example, if the number of StoreToRAM measurements was set to 10, a single TTL signal would trigger the spectrometer to take 10 consecutive measurements and saved the measurements to the onboard RAM. For the EVO electronics boards, enabling the "single scan trigger" function sets the received signal to only take one StoreToRAM measurement. Because of this, the measurement number will not change from 0 to 1 until the spectrometer receives enough external triggers to match the number of StoreToRAM measurements. In this instance, if the number of StoreToRAM measurements was again set to 10, a single TTL signal would only trigger the spectrometer to take one measurement, and the measurements would not be complete until 10 TTL signals were received by the spectrometer. With either of these measurement modes, it is important to remember to change the measurement type from continuous to StoreToRAM, which can be accessed by the dropdown arrow to the right of the start measurement button (circled in red to the left).



With these steps complete, the AvaTrigger can be utilized to externally trigger measurements for our spectrometers. Please reach out to our support team at support@avantes.com for further explanation or troubleshooting options.

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CONTACT

WE'RE HAPPY TO HELP

Curious how spectroscopy can help you reveal answers by measuring all kind of materials, in-line, at your production facility, in a lab or even in the field? Please visit our website or contact one of our technical experts, we're happy to help you.

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