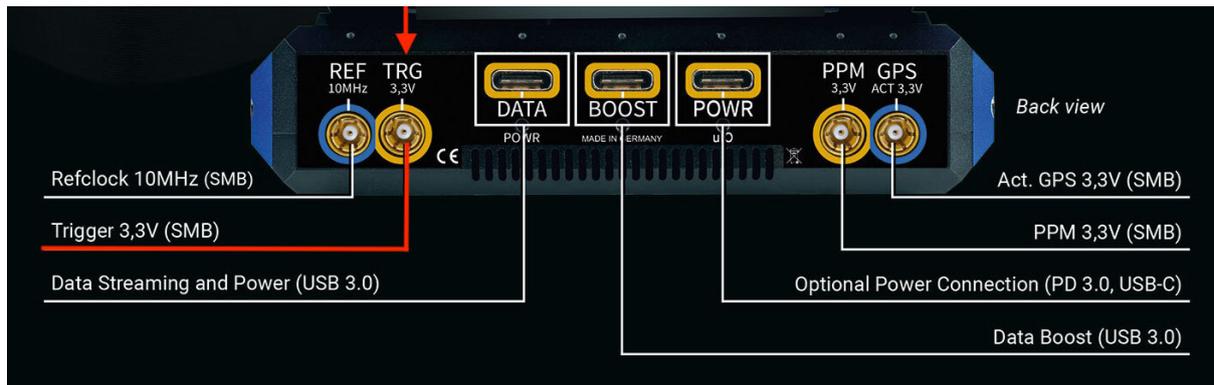


Using the external trigger input of the SPECTRAN V6

Setup and Preparation

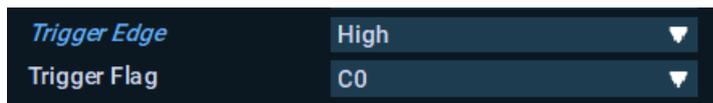
Physical Setup

Connect the trigger source to the Trigger Input of Spectran V6. Please make sure the maximum trigger level does not exceed 3.3V, while low -> high transition threshold is 1.4V and high -> low transition threshold is 0.7V.



Configuring the V6 Block

All data streams in the AARONIA RTSA suite carry four condition flags C0, C1, C2 and C3 which can be used to filter or trigger the data stream in downstream blocks. The physical trigger input of the V6 can be mapped to any of those four flags by selecting the Trigger flag.



The physical trigger signal may be either low or high active and can be inverted when setting the stream condition by changing the trigger edge to low. Selecting one of the transitioning condition rising, falling and changing will result in short pulses of the condition flag in the stream.

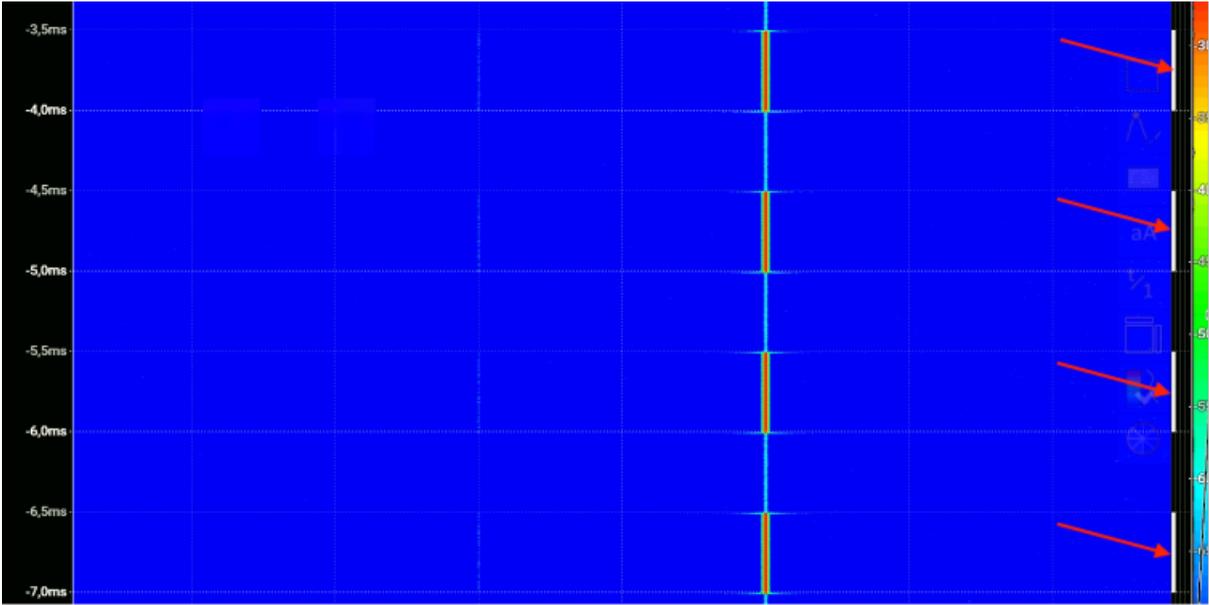
Viewing Trigger Events

Spectra in the Waterfall

The condition flags can be displayed in the waterfall view by enabling the conditions checkbox in the waterfall block view section.

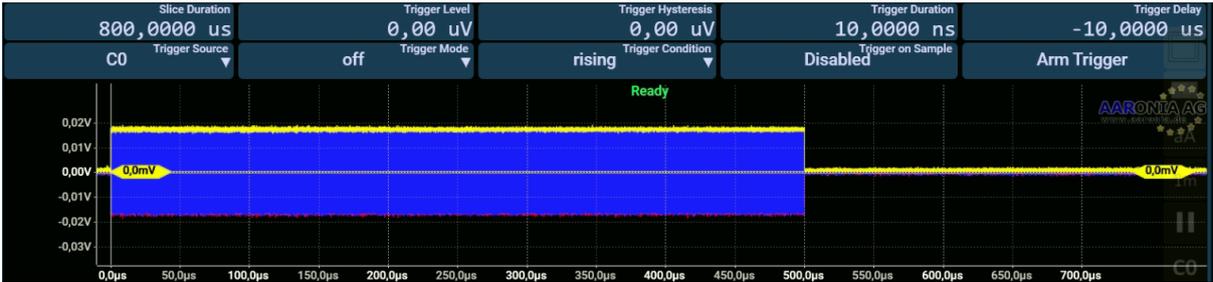


The state of the four condition flags (and thus the trigger as well) is displayed alongside the spectra at the right side.



IQ Samples in the IQ Oscilloscope

The condition flags are available in the IQ oscilloscope blocks as trigger source:



Stream Events in the Stream Debugger

The raw condition flags can also be observed in the stream debugger block

Arrival	Delay	Start	End	Duration	Flags	Warn	Payloa
4060	13:01:39.845801	3,079ms	13:01:39.842721	13:01:39.843221	500,040us	-- -- -- -- --	-- -- -- -- -- iq
4061	13:01:39.845847	2,626ms	13:01:39.843221	13:01:39.843721	499,996us	-- -- -- -- -- C0	-- -- -- -- -- iq
4062	13:01:39.846884	3,162ms	13:01:39.843721	13:01:39.844221	499,996us	-- -- -- -- --	-- -- -- -- -- iq
4063	13:01:39.846925	2,704ms	13:01:39.844221	13:01:39.844721	499,996us	-- -- -- -- -- C0	-- -- -- -- -- iq
4064	13:01:39.846972	2,251ms	13:01:39.844721	13:01:39.845221	499,996us	-- -- -- -- --	-- -- -- -- -- iq
4065	13:01:39.848456	3,235ms	13:01:39.845221	13:01:39.845721	499,996us	-- -- -- -- -- C0	-- -- -- -- -- iq
4066	13:01:39.848506	2,785ms	13:01:39.845721	13:01:39.846221	499,996us	-- -- -- -- --	-- -- -- -- -- iq
4067	13:01:39.848548	2,326ms	13:01:39.846221	13:01:39.846721	499,996us	-- -- -- -- -- C0	-- -- -- -- -- iq

The stream is split into packets of variable length, and each packet has the condition flag either set or reset.

Capture and Export Trigger Events

Capture in the IQ Oscilloscope

Once an event has been captured with the oscilloscope, it can be exported for external processing as e.g. CSV by using the export button on the top right of the block. To capture a single event, select once as the trigger mode.

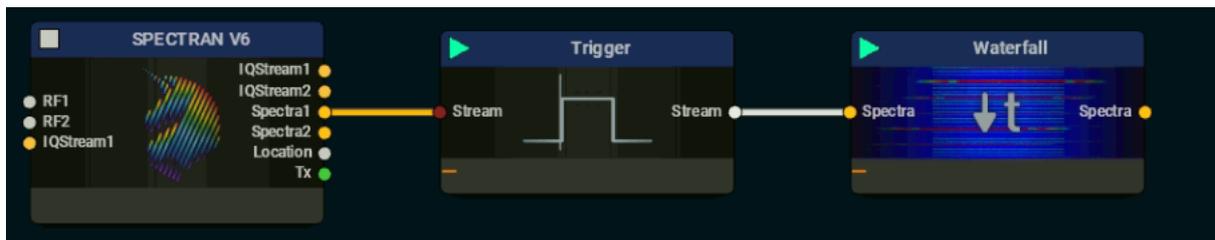


The trigger point will be at a time offset of zero in the CSV file:

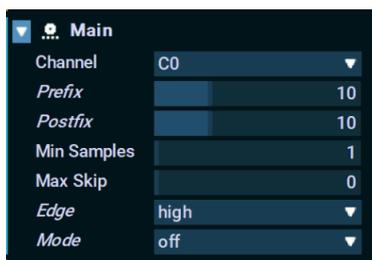
```
#type IQTriggerOsci
#unit volt
#startTime 1654591852.000000000
#frequencyStart 999999375.000000
#frequencyStep 9216000.000000
"IQTriggerOsci","I","Q"
-0.000010000, -1.41538e-05, -0.000382566
-0.000009989, 0.000688224, 0.000194928
-0.000009978, 0.000521025, -6.8049e-05
-0.000009967, -0.000715662, 0.000142379
...
...
-0.000000039, -0.000220595, 0.000302635
-0.000000028, 0.00053103, -0.000715529
-0.000000017, -0.0016014, -2.82819e-05
-0.000000007, -0.0144669, 0.000612515
0.000000004, -0.0146132, -0.00824326
0.000000015, -0.00511983, -0.0164744
0.000000026, 0.00623113, -0.0157965
0.000000037, 0.0153135, -0.00878182
...
...
```

Capture with the Trigger Block

The trigger mode is a stream filter, that uses the condition flags to extract a subsequence of a stream (either spectra or IQ).

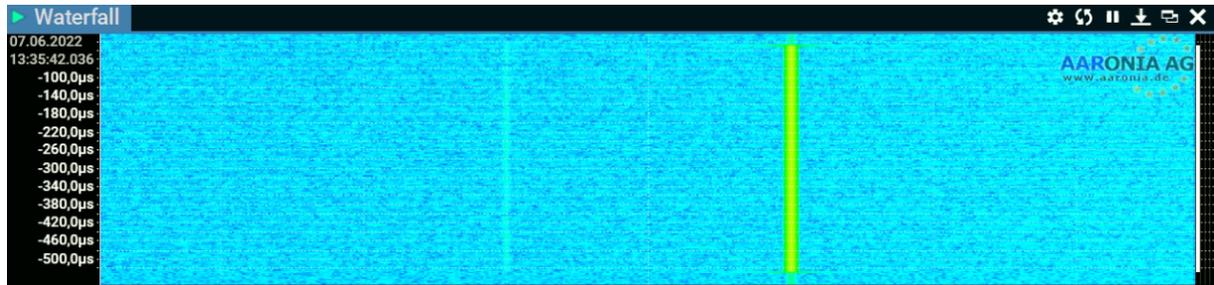


The trigger block has various options:



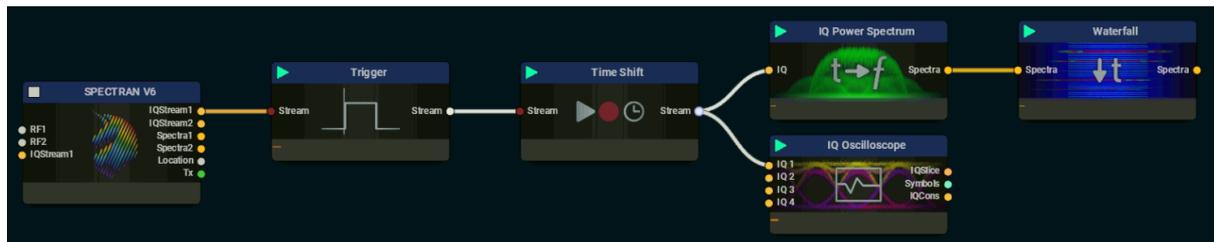
The trigger edge and channel work similar to the IQ oscilloscope, but it works in samples (full spectra or individual IQ samples based on the data fed in). To capture a single event, set the mode to “once”, it will return to “off” once the event has been caught. A transition-based capture (rising, falling or both) will result in a single sample capture.

The capture size can be extended to include samples before and after the trigger event using the prefix and postfix setting.



Capture with the Time-Shift Block

The time shift block records incoming streams into a circular memory buffer and replays them on request. Combining this with a trigger blocks allows the repeated replay of a trigger event for further analysis in downstream blocks. The captured event can also be saved for later use.



To start capture:

- Set the trigger mode to “off” in the trigger block
- select the buffer size and press the “Start Capture” button
- Enable the trigger by setting the mode to “once”
- Wait for the event to happen
- Press the “Stop Capture” button

The event can then be replayed with the “Play” button.

Capture with the Script Block

The script block receives the stream as individual packets and has access to the flags, which contain the C0 to C3 conditions.

```
port { DSPStream } from "dspstream.js"

DSPStream.receivePackets(0, (flags, meta, samples) => {

    if (flags & 0x10000000)
        console.log(flags, meta.samples);

});
```

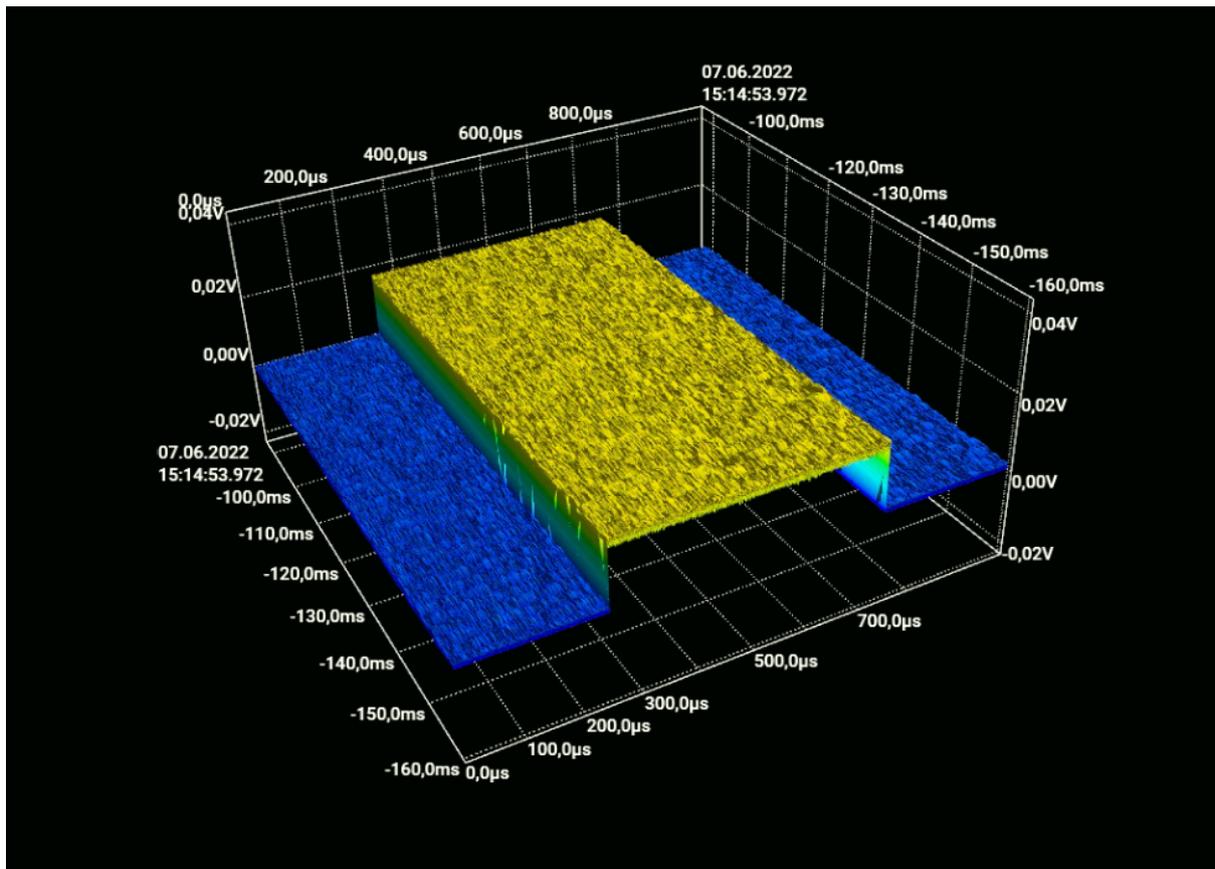
The script block can save or process the packets that have the condition flag set (e.g. measure the length of the trigger etc.)

Gated Measurements

The trigger can also be used to continuously filter data for further processing, e.g. only accumulating data while the trigger is set.

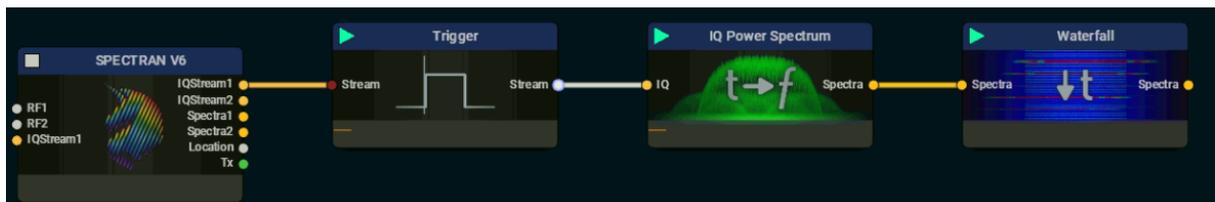
Repeated Trigger with 3D Oscilloscope

The 3D IQ oscilloscope can be used to compare a series of events using a 3D visualization.



Filter with Trigger Block

The trigger block in continuous mode can filter the incoming stream to only consider the samples that are received while the trigger condition is met.



The result excludes all the inactive time periods.

