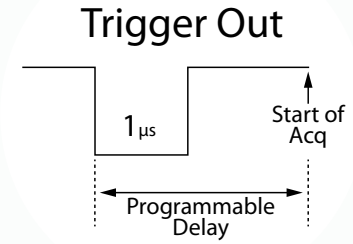
Verasonics®
The leader in Research Ultrasound™

Vantage™ External Synchronization Triggers

The Vantage system has both trigger in and trigger out capability via dedicated BNC connectors located on the rear I/O panel.

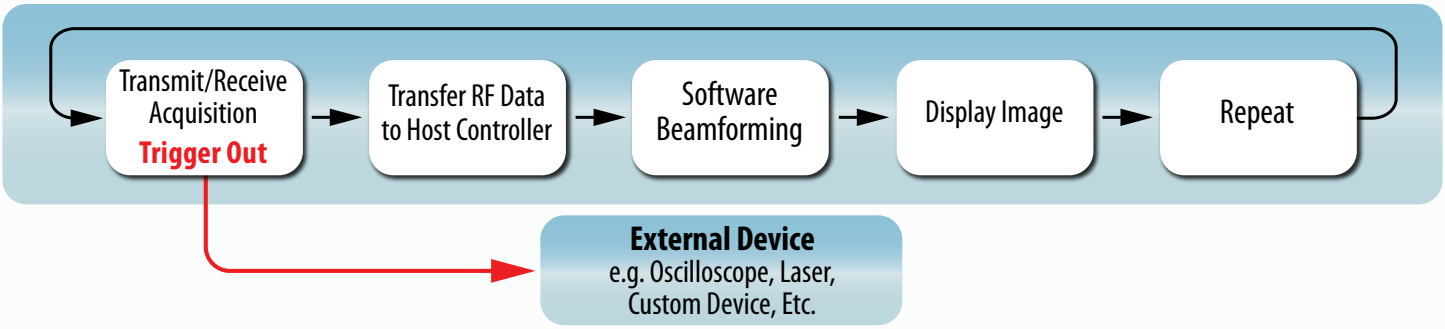
Trigger Output

The trigger output pulse is a 3.3 volt LVTTL-compatible signal that provides a 1 microsecond active low output. A trigger pulse can be generated by placing a trigger command in a sequence of events programmed by a user. The trigger output provides the least amount of jitter when synchronizing with an external device. The trigger output pulse can also be delayed from the start point of acquisition by a user specified amount of time to align with user requirements.



Example #1: Trigger an external device

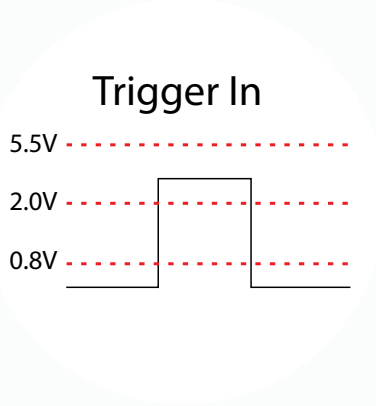
The sequence below shows a trigger out placed in the same event as a transmit/receive acquisition. By placing the output trigger in a transmit/receive event, the variability of the trigger edge relative to the start of transmit and the start of data acquisition will be very small, less than 4 nanoseconds.



Trigger Inputs 1 and 2:

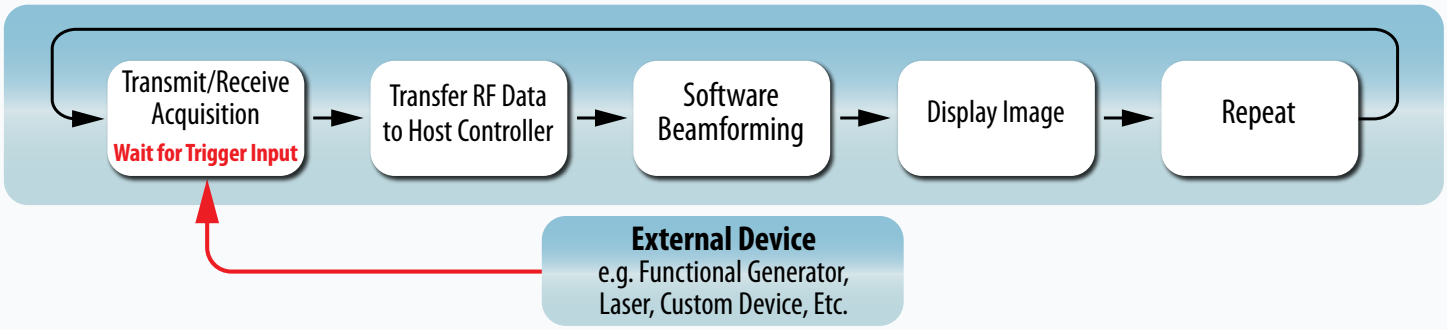
A trigger input pulse should be a signal level of 3.3 volts LVTTL. Each trigger input can be programmed to activate on the rising edge or falling edge of an input signal. If both inputs are defined they must be phase aligned on the rising or falling edge. In order to guarantee the system is externally triggered, the low level LVLTTL signal should be below 0.8 volts and the high level LVLTTL signal above 2.0 volts. See the diagram to the right.

Note: The voltage level must not exceed 5.5 volts. The timing accuracy of the trigger input is determined by ¼ of the ADC sampling rate, typically set by the transducer center frequency.



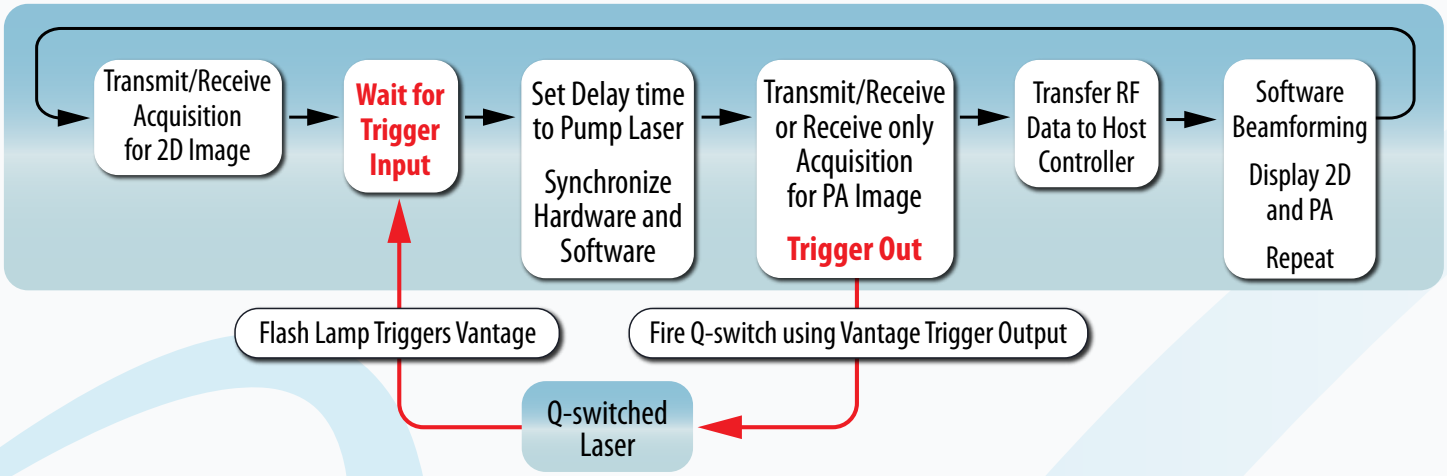
Example #2: Wait for a Trigger Input from an external device

The sequence below shows a trigger input placed in the same event as a transmit/receive. The sequence will pause and wait for a trigger input before continuing. A trigger time-out can also be specified in a sequence to avoid a "wait forever" condition.



Example #3: Photoacoustic Synchronization with Triggers

The sequence below synchronizes a Q-switched flash lamp-pumped laser with the Vantage system utilizing both trigger in and trigger out functions. The first event in the sequence contains a 2D acquisition immediately followed by a "wait for trigger input" to wait for the firing of the flash lamp to trigger the Vantage system. Once the Vantage is triggered, the sequence pauses the hardware to allow the laser to pump before sending a trigger output to fire the Q-switch and begin the receive-only acquisition simultaneously. Finally, the data is transferred to the host computer and processed to form an image.



Verasonics Inc.
11335 NE 122nd Way, Suite 100, Kirkland, WA 98034
www.verasonics.com | sales@verasonics.com | 425.998.9836