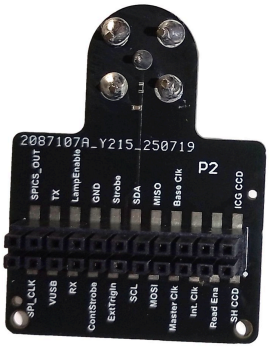
TA-USB2k trigger adapter

BNC access to the external trigger of Ocean Optics spectrometers with a 22-pin accessory connector.

The TA-USB2k plugs directly into the spectrometer accessory connector and brings the external trigger input and ground to a standard BNC connector. No soldering or loose wires are needed, which avoids miswiring and short circuits on the connector.



Spectrometer side: 22-pin socket

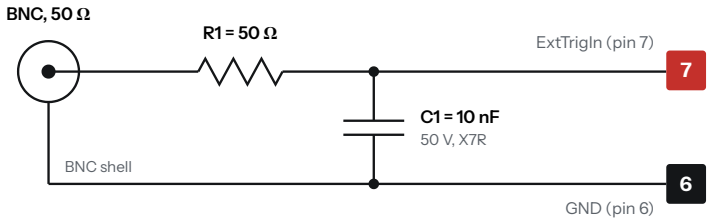


Cable side: BNC jack

Specifications

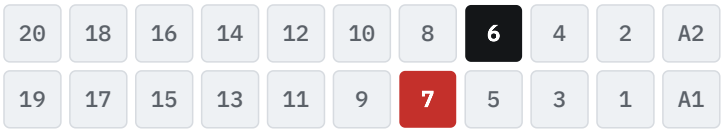
Part number	TA-USB2k (replaces OOTRIGGER for 22-pin spectrometers)
Compatible spectrometers	USB2000+, USB4000, Jaz, HR2000 (22-pin accessory connector)
Spectrometer connector	22-position socket, 2.54 mm pitch
Trigger connector	BNC jack, 50 Ω
Signals connected	Pin 7 (ExtTrigIn) through the filter; pin 6 (GND) to the BNC shell. All other pins are not connected.
Filter	RC low-pass: 50 Ω in series, 10 nF to ground (τ = 0.5 µs, $f_c \approx$ 318 kHz)
Board size	32 × 42 mm
Total height	27 mm, from socket top to BNC end
Warranty	1 year against manufacturing defects or malfunction

Circuit



Spectrometer pinout

Looking at the front of the USB2000+. Red: ExtTrigIn. Black: GND. Grey: not connected by the adapter.



Trigger input

Signal type	TTL. The rising edge triggers the acquisition in External Hardware Edge Trigger mode.
Level	3.3 V or 5 V logic high, 0 V logic low
Maximum level	Do not exceed 5.5 V, the maximum Ocean recommends on the trigger pin. The USB2000+ data sheet also gives a general +4 V absolute maximum on any pin; use 3.3 V to stay within that figure. The adapter does not reduce or clamp the level. No negative voltage.
Input impedance	About 50 Ω for fast edges, high at DC. The input is not a 50 Ω DC termination: a source set for a 50 Ω load will deliver about twice its displayed amplitude.
Pulse width	Ocean minimum at the pin: 100 ns high (USB2000+). The adapter filter slows the edge, so use about 1 µs or more; 5 µs is recommended for full settling (see table).
Spectrometer timing	Maximum trigger rate: 344 Hz at 1 ms integration (USB2000+, firmware 3.0 and above).

Calculated voltage at the spectrometer pin

Pulse width	3.3 V, 50 Ω source	3.3 V, low impedance	5 V, 50 Ω source	5 V, low impedance
100 ns	0.31 V	0.60 V	0.48 V	0.91 V
1 µs	2.09 V	2.85 V	3.16 V	4.32 V
5 µs	3.28 V	3.30 V	4.97 V	5.00 V

Calculated from the RC filter, not measured. The filter also delays the trigger edge by roughly 0.5 to 1 µs.

> **Two spectrometers on one source:** a BNC T connector places both adapters in parallel, so the source must drive 20 nF. Use a low-impedance source or one output per spectrometer.

Spectrometer limits are taken from the Ocean Optics USB2000+ Data Sheet and External Triggering Options instructions. Ocean Optics, USB2000+, USB4000, Jaz and HR2000 are trademarks of their owners. Sepradel and its products are not affiliated with, endorsed by, or sponsored by Ocean Optics.