

EZ Patch quick guide

Programmable Digital Output

This short guide illustrates how setup and configure a programmable TTL-compatible digital output signal from ePatch amplifier.

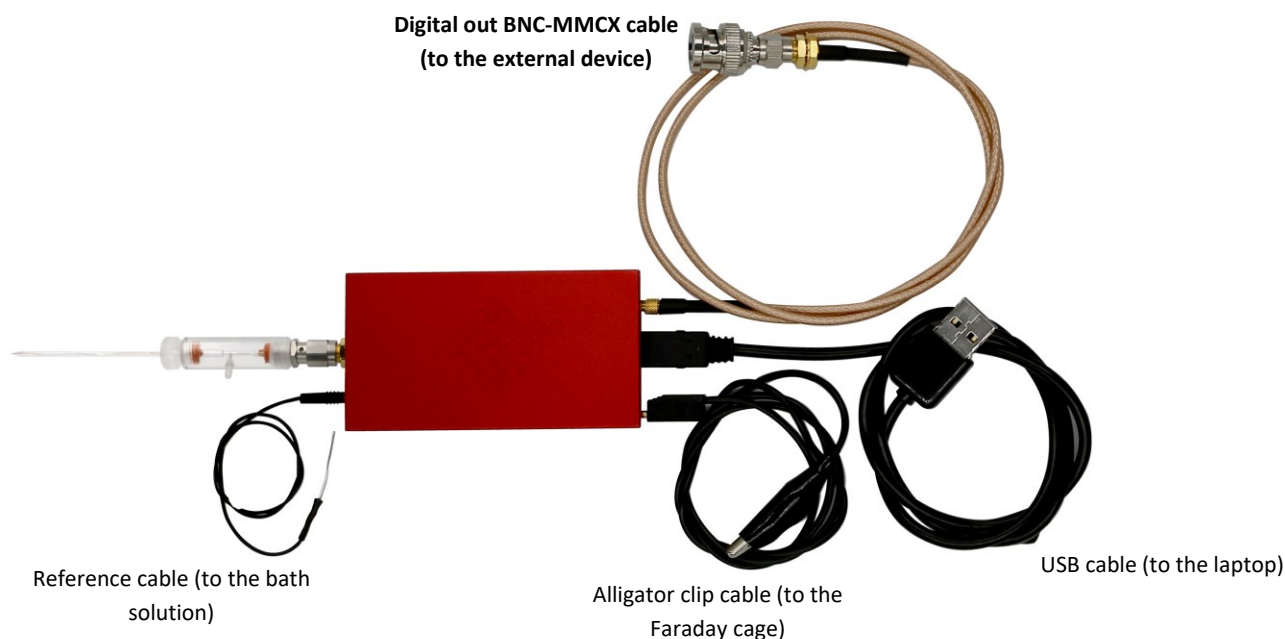


Figure 1: connection scheme of ePatch amplifier

Digital output connection in ePatch amplifier

ePatch amplifier embeds one TTL-compatible digital output port located on the back side (Fig. 2) which enables the control of other instruments, such as perfusion systems, lamps, stimulators etc.

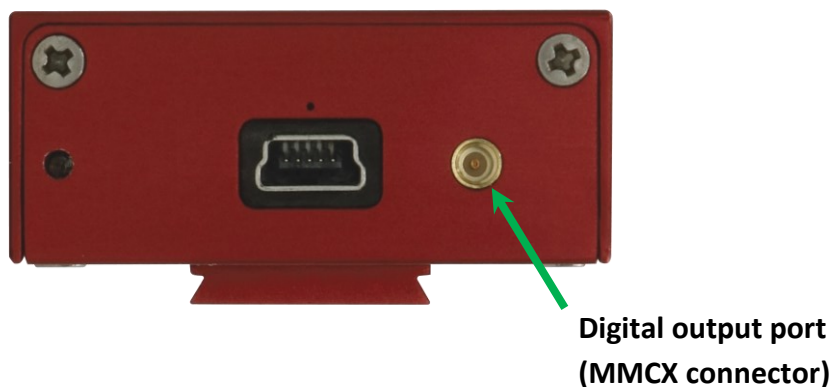


Figure 2: Digital output port on the back side of ePatch

Use the provided BNC-MMCX (Fig. 3) to connect the ePatch amplifier to the input (BNC) port of the external instrument you need to control. Follow the connection scheme shown in Figure 1.

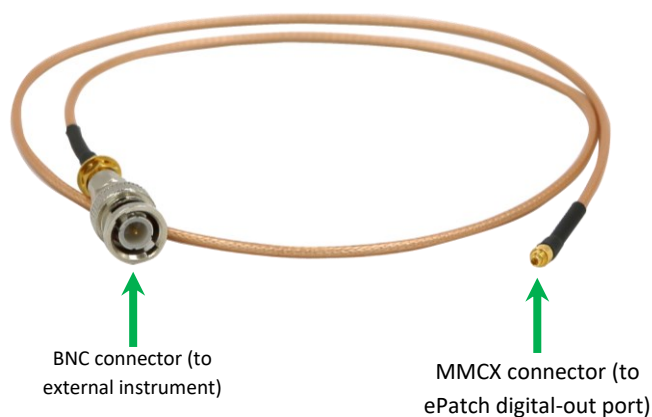



Figure 3: BNC-MMCX cable provided with ePatch

Configure the digital output signal in EZPatch software

After connecting ePatch to the external device, you can proceed to couple the rising and falling edge of the TTL output signal to any voltage-clamp or current-clamp protocol using EZ-Patch software. The rising and falling edges can be set-up using a cursor based approach already described either in the “[Online Analyses](#)” guide or in the corresponding [video guide](#). Please note that the TTL signal must be coupled to a stimulus (voltage or current) protocol; in other words, the TTL signal cannot be delivered without running a voltage- or current-clamp protocol.

Open the “**protocol editor**” using the dedicated button  and add two new cursors to the displayed waveform preview (activate the “manage cursor” tool and double click within the waveform preview) (Fig. 4). Then, right click to one of two cursors to get access to its properties panel (Fig. 4) where you can find the **digital output settings**. Assign either a **rising** (+ 5 V) or a **falling** edge (0 V) to a cursor to set up the control of an external device. Use the dropdown menu of the “sweeps” option to couple the digital out signal only to a defined sweep of the protocol.

Please note that using the “rising” and “falling” edges options, the maximum number of rising and falling edges that can be set per protocol is 82. For example, if you set a rising and a falling edge in each sweep, the signal will be delivered only for the first 41 sweeps.

Alternatively, the digital output signal can be delivered by setting the “**pulse**” option from the “digital trigger output” dropdown menu. In this case, position only one cursor where the digital output signal should start and set its duration in the cursor property panel. Using the pulse option, the number of digital pulses is infinite; its use is recommended when short digital out pulses must be delivered at high frequencies or when you notice a delay in the communication with the device (e.g. if you press the rec button and the plot of the data is delayed).

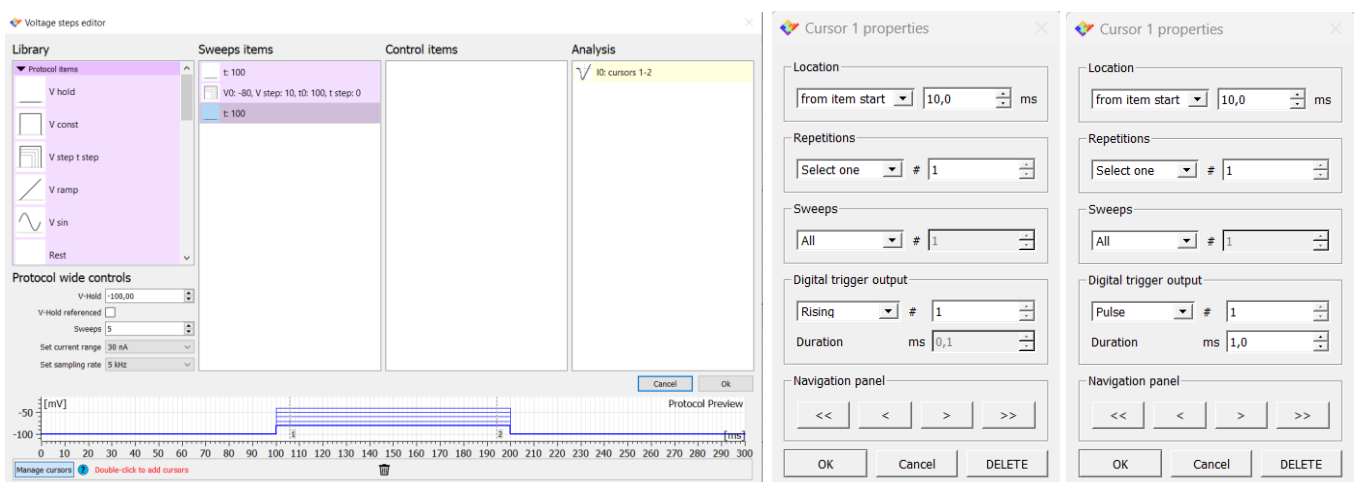


Figure 4: Protocol editor (left) and cursor properties panel set as Rising (centre) or Pulse mode (right).