Quantum Opus Multichannel Nanowire Electronics Module (QOELEC)
Remote Operation Commands

The following ASCII commands can be sent to the QOELEC module through standard USB serial interfacing in your programming language of choice.

Command	Description
+A?	Query module identification string.
+B?	For the presently selected channel, query device bias in DAC units $(0 - 1023)$ for 0 to 50 µA device bias current.
+Bd;	For the presently selected channel, set device bias current in DAC units ($d = 0 - 1023$, integer values). 0 = off, 1023 = 50 µA. The bias current defaults to zero upon power-up.
+H1;	Store the presently set bias for *all channels* into non-volatile memory. The values will be written into internal non-volatile memory for reproducible biasing of the device through the "H;" command (below). **Note: The internal non-volatile memory is only guaranteed to survive for 100,000 write functions. This limit can be easily exceeded if an external program repeatedly calls this function.**
+H?;	Return the DAC values of the biases stored in non-volatile memory.
+H;	Sets the bias for *all channels* to the values stored in non-volatile memory.
+M?	Query the presently selected device channel.
+Md;	Select the channel d. Subsequent channel-specific commands will address only the selected channel (e.g., setting and reading bias)
+N?	Query the two thermometer channel currents.
+Nm,n;	Set the two thermometer channel currents in to m and n, respectively, in DAC units $(0 - 1023)$ for 0 to 50 µA. Note that the thermometers are only calibrated at 10 µA bias current.
+Pd?	Query the two thermometer ADC values. See sample code for converting to temperature.

Note: Do not issue other serial commands as unexpected module behavior is likely to result.

Important! Note that the "+H;" function, if called repeatedly, can cause hardware failure. If the non-volatile memory is written repeatedly more than about 100,000 times it is possible for the non-volatile memory to become non-functional. All other functions are safe to call with any argument and as often as desired without potential damage to the electronics or nanowire devices.

Prepared by: A.J.Miller, 21 Oct 2020

Quantum Opus, LLC | 22241 Roethel Dr Suite A | Novi , Michigan 48375 | 269.248.1004