Quantum Opus

SIM900 compatible Quantum Opus Nanowire Electronics Module (QO-AMP-SIM)
Remote Operation Commands

The following ASCII commands can be sent to the QO-AMP-SIM module through the messaging system built into the Stanford Research Systems SIM900 electronics enclosure. Consult the SIM900 electronics documentation provided by Stanford Research Systems (www.thinksrs.com) for details on communicating to SIM modules.

Command	Description
+A?	Query module identification string.
+B?	Query device bias in DAC units (0 ─ 65535) for 0 to 2.5 V bias through 100 kΩ bias resistor (0-25 µA bias current)
+B*d*;	Set device bias current in DAC units (*d* = 0 ─ 65535, integer values). 0 = off, 65535 = 25µA. The bias current defaults to zero upon power-up.
+C*d*;	Set ADC gain (*d* = {0, 1}). Set *d* = 0 for high-gain mode; set *d* = 1 for low-gain mode.
+C?	Query device voltage in ADC units. If module is in high-gain mode (setting 0) the voltage (in volts) is calculated as (ADC units)/65535*1.1. If the module is in low-gain mode (setting 1) the voltage (in volts) is calculated as (ADC units)/65535*5.0.
+D*d*;	Set the Reset Event duration (*d* = 0 ─ 255, integer). Sets the length of time the device bias is set to zero when a latch condition (i.e., device in non-superconducting state) is detected. The duration (in milliseconds) is calculated as 10**d*. (Default: 10, i.e. 100ms)
+D?	Query the presently set Reset Event duration. Duration (in milliseconds) is calculated as 10**d*, if *d* is the return value.
+E*d*;	Enable (*d* = 1) or disable (*d* = 0) the auto-reset function. When enabled the module will monitor the voltage on the nanowire device and if it exceeds an internally set value indicating the device is no longer superconducting, an auto-reset event will be triggered. If disabled, a latch condition will be persistent until manually cleared by front-panel operation or by initiating a reset event through software (see command "F", below).
+E?	Query the auto-reset function. Return value is 1 if enabled, 0 if disabled.
+F;	Initiate a Reset Event. The device bias is reduced to zero, held at zero for the Reset Event duration (command "D", above), and then returned to its previously set value.
+G;	Initiate the auto-bias function. The device bias current is swept up from zero until a latch condition is detected. This latching current is measured. A Reset Event is initiated and then the bias is increased back up to approximately 95% of the measured latching current. This function is most reliable when the incoming light on the device is minimized as incoming photons can cause a slightly lower measured latching current. Note: The auto-bias function can result in slightly different bias currents each time it is run.
+H*d*;	Store a bias DAC value into non-volatile memory (*d* = 0 ─ 65535, integer values). 0 = off, 65535 = 25µA. This value 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 value of the DAC bias stored in non-volatile memory. The bias value (in microamps) is calculated as *(return value)*/65535*25.
+H;	Sets the device bias to the value stored in non-volatile memory.

Important! Note that the "+H*d*;" 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.

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