Product Features

- Designed for use with with Radiall Cryogenic Microwave Switch: **R583423141**
- Dedicated hardware timing control logic on each channel delivers user programmable current-limited actuation pulses to cryostat
- Inductive load protected outputs
- Optimized pulse control and signal conditioning to minimize power dissipation in cryogenic environment
- Typical transient heating $<$1mK/actuation
- USB controlled and powered
- Controls up to 4 separate SP6T switches from a single module

Cryogenic Microwave Switch Controller

General Description

The CryoSwitch Control Module is designed specifically for use with Radiall's SP6T Cryogenic Latching Bipolar Actuator (Model R583423141). The controller features a simple to use interface, which allows control of the switches using standard USB serial communication.
The CryoSwitch Control Module contains 4 ports (A, B, C, D). Each port controls a separate SP6T switch. The number of enabled ports depends on the initial product order configuration; however, additional ports may be unlocked at a later time via software upgrade. In standard operation, for a given port, each of the 6 RF outputs can be connected (disconnected) to the common RF input by sending the appropriate command. The connect (disconnect) command triggers a current-limited, time-adjustable pulse with positive or negative polarity between the corresponding pair of output signals. Dedicated output monitoring circuitry ensures in hardware a maximum pulse width of 100ms to protect against excessive heat dissipation in the cryostat.

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Electrical Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage (USB)	V_s	-	5	-	V
Supply Current (USB)	I_s	-	150	700	mA
Output High Voltage	V_{OH}	5	-	28	V
Output Low Voltage	V_{OL}	0	-	-	V
Operating Temperature	T_{op}	-	25	-	$^{\circ}C$

Table 1: Electrical Characteristics

Timing Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit
Output Pulse Width	t_s	1	-	100	ms

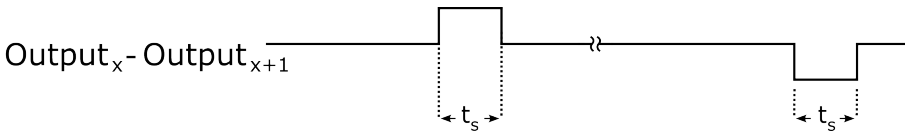
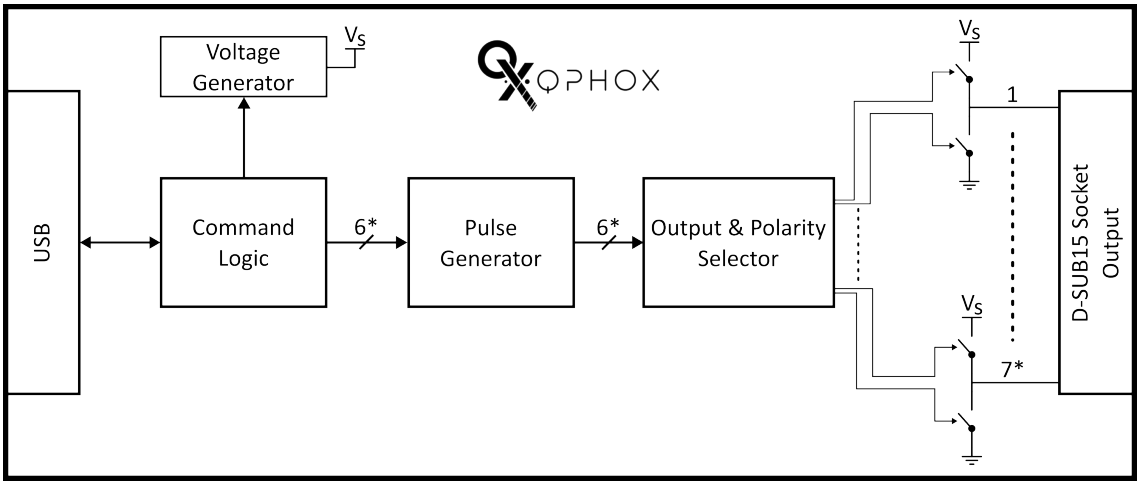


Figure 1: Timing Diagram

Internal Block Diagram



*Configuration dependent. Only a single port is shown.

Dimensions

220mm (L) x 103mm (W) x 30.5mm (H)

Application Information

Refer to the **CryoSwitch** repository for further information and supporting SDK.

Interface

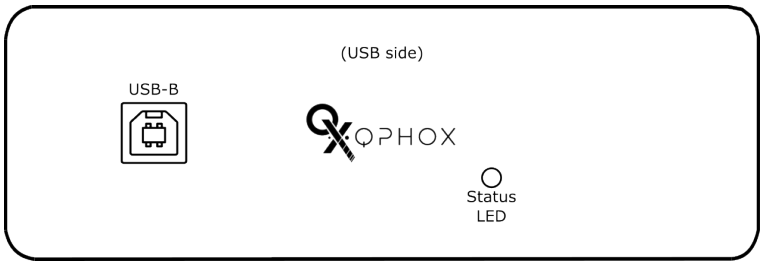


Figure 2: Input side

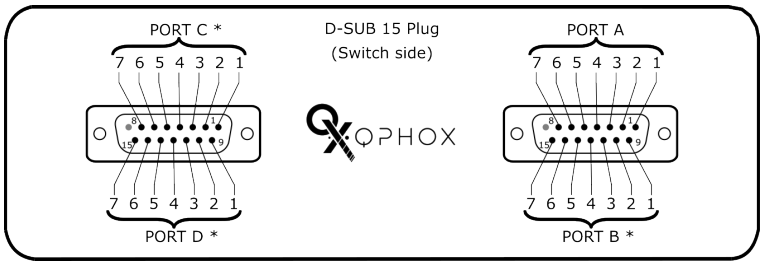


Figure 3: Output side

*Configuration dependant

Status LED color indication:

- ● Waiting for command
- ● Processing
- ● Error

Ordering

Model	Number of ports
CryoSwitchControllerP1	1
CryoSwitchControllerP2	2
CryoSwitchControllerP3	3
CryoSwitchControllerP4	4

* Models can be later upgraded in software. Please contact info@qphox.eu.