Product Features

- Designed for use with with Radiall Cryogenic Microwave Switch: **R583423141** or **R573423600**
- Dedicated timing control logic on each channel
- Adjustable output voltage and pulse width
- Inductive load protected outputs
- Optimized pulse control and signal conditioning enables minimum power dissipation in cryogenic environment
- Typical transient heating <1mK/actuation
- USB or Ethernet controlled
- USB powered
- Controls up to 4 separate SP6T switches from a single module

General Description

The CryoSwitch Control Module is designed for use with Radiall's SP6T Cryogenic Latching Bipolar Actuator (Model R583423141 or R573423600). The controller features a simple to use interface, which allows control of the switches using standard USB serial communication or Ethernet.
The CryoSwitch Control Module contains 4 ports (A, B, C, D). Each port can control up to seven channels, or in other words one 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 outputs can be connected (disconnected) to the common 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.

Cryogenic Microwave Switch Controller

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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
Output Current	I_L	0	60	100	mA
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
Min. Pulse delay	t_d	25	28	30	ms

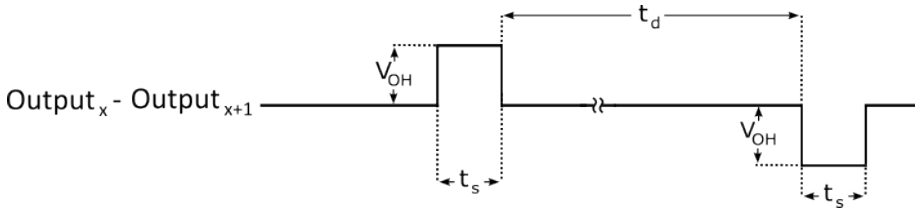
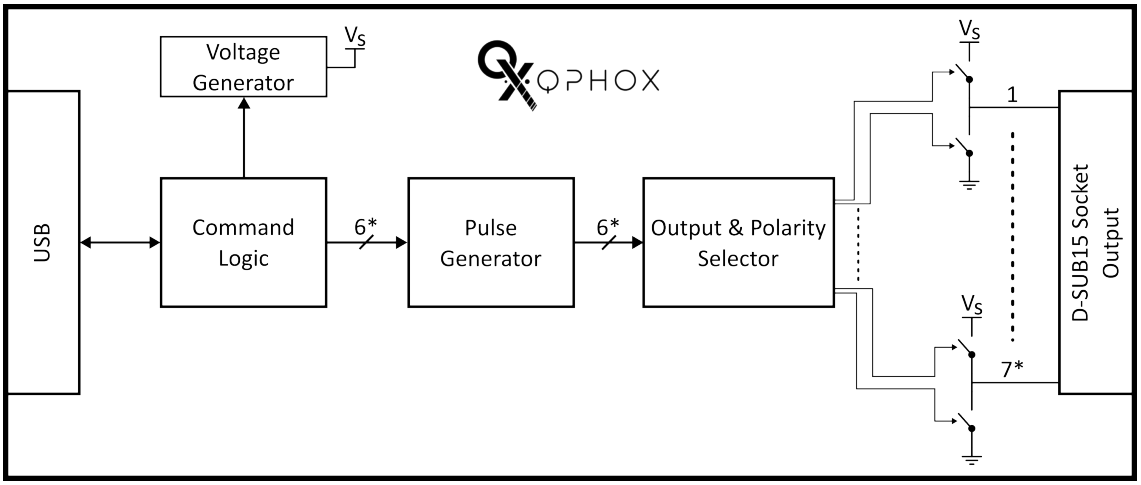


Figure 1: Timing Diagram

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

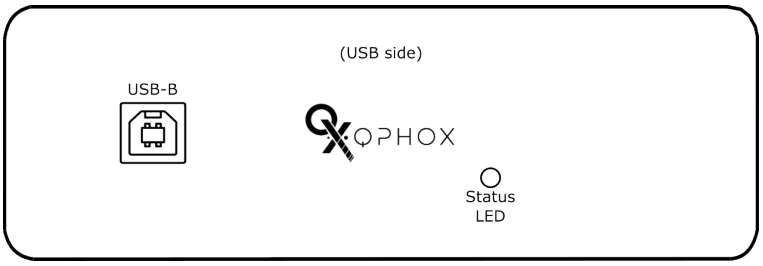


Figure 2: Input side

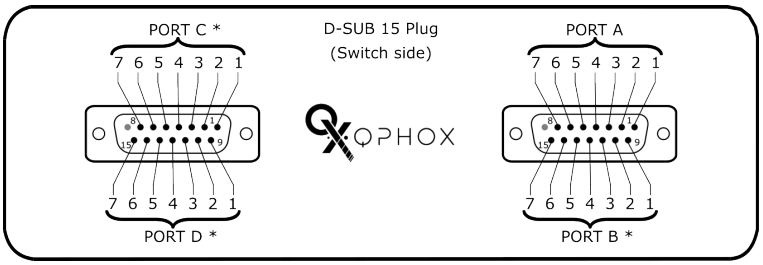


Figure 3: Output side

*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.