

# Quarch Technology Ltd

## Torridon Drive Control Modules

### Example Scripts – Standard Hot Plug

For use with:

**QTL1253 – Torridon miniSAS Cable Pull Module**

Using Quarch firmware version 3.5x

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## Typical Cable Plug / Pull

### Aims

We are aiming to simulate the hot-plug conditions for a mini-SAS cable

Modules running version 3.5x firmware and above have a default hot-plug scenario that corresponds to a basic plug/pull scenario for this connector. First we will use this default, and then we will define a custom timing scenario.

### Default Plug/Pull

When the module is first connected, it will hold the cable in the 'powered up' (connected) state. This means that the cable will operate as normal.

The default timing sequence on the module is that all signals disconnect at the same time:

All Signals - Disconnects at 0mS

We now send the 'power down' command to disconnect the cable:

*>run:power down* - initiate a "pull"

The cable will now be completely disconnected. To 'plug' the cable we need to power it up. If we don't make any changes to the timing settings then the power down sequence will be the opposite of the power up one:

All Signals - Disconnects at 0mS

We now send the 'power up' command to reconnect the cable:

*>run:power up* - initiate a "plug"

## Setting up a custom hot-plug

Now we will send commands to the module to create a custom timing sequence. This example can be altered by you in the future to create any timing pattern you need.

In this case, we will create a timing scenario that will connect lane 0 20mS before connecting the other lanes.

First, we need to define 2 sets of pins that mate at different times, to do that we assign each set of pins to a different control source:

Lane 0	- assign to S1
Lane 1, 2, 3	- assign to S2

## Signal Assignments

To assign a signal to a control source we write to that signals control source setting. Individual signal names follow the SAS specification (TX0\_PL, TX0\_MN, etc). You can also set multiple signals at once by using a 'group' name.

For the mini SAS module, the names are: LANE0, LANE1, LANE2, LANE3. Each lane consists of all 4 signals required for that lane. We need to send the commands:

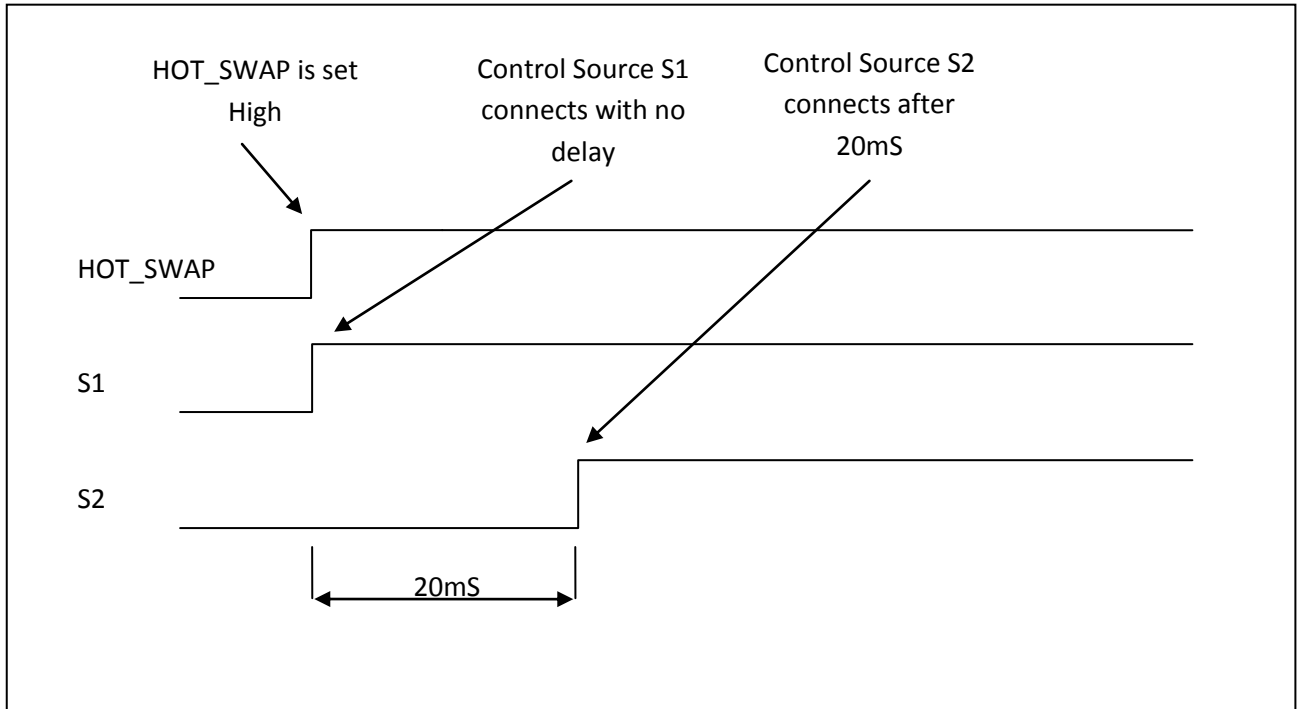
<code>&gt;signal:LANE0:source 1</code>	- assigns all lane 0 signals to S1
<code>&gt;signal:LANE1:Source 2</code>	- assigns all lane 1 signals to S2
<code>&gt;signal:LANE2:source 2</code>	- assigns all lane 2 signals to S2
<code>&gt;signal:LANE3:source 2</code>	- assigns all lane 3 signals to S2

Now we've assigned each of the signals to a control source, but haven't defined what each control source will do.

## Source Assignments

The next step is to define the behavior of each control source. We need to define the length of time between each set of pins mating. We know that all the signals on source 2 need to connect 20mS after those on source 1.

*Power Up Sequence*



Set S1 delay to zero.

`>source:1:delay 0`

- set S1 initial delay to 0

Set S2 delay to 20ms

`>source:2:delay 20`

- set S2 initial delay to 20ms

## Initiating the Plug

After this point the card is set up, to operate the card run the power up command to initiate a “plug”:

```
>run:power up - initiate a “plug”
```

The “run:power up” command has the same effect as setting reg 0x00 bit 0:

```
>write 0x00 0x01 -set HOT_SWAP and initiate a “plug”
```

BUSY bit 1 in reg 0x00 is set for the duration of the hot swap (50mS in this case).

## Initiating the Pull

Initiating a Hot Pull is simply a case of running the power down command; the module will automatically reverse the connection sequence:

```
>run:power down - initiate a “pull”
```

In this case, LANE0 will be disconnected 20mS after Lanes 1,2,3.

## The Final Script

```
# Standard cable Hot Plug,  
# 20ms between LANE0 and LANE(1-3)  
#  
# Assign each signal to a control source  
# LANE0 to Source 1  
# LANE1, LANE2, LANE3 to Source 2  
signal:LANE0:source 1  
signal:LANE1:source 2  
signal:LANE2:source 2  
signal:LANE3:source 2  
#  
# Assign a delay to each control source  
# Source 1 delay to 0mS  
# Source 2 delay to 20mS  
#  
source:1:delay 0  
source:2:delay 20  
#  
# Start the power up sequence  
run:power up
```