**Solid state switch trade study**

The need for a solid state switch is driven by the need for a simple yet reliable deployment system. The design we have been working with is simply not adequate. The previous design had all of our battery current traveling the length of our satellite to a deployment switch. It is a severe inefficiency and a weak point of failure.

A solid state relay allows us to run a small current through the deployment switch which allows the battery current to flow through the switch. It still represents a point of failure, but it is contained to the battery board and does not have the losses of sending high current through a wire. One result of this is that we will need to carefully select a rad hard solid state relay and rout the control wire carefully.

Requirements:

* Max current of at least 10A
* The control voltage should be larger than the range of our battery voltage.
* The form factor be tall and skinny to fit on the side of the battery board, or thin enough to fit under the batteries or on the bottom of the board.
* It must be of high enough quality that there is minimal risk of an internal Mosfet latching up or other rad related issues. (Question: do all Solid state Relays use a Mosfet?)
* Temp range between -40 and 85.

Other considerations:

* Lowest internal resistance.
* Lowest control current.
* Lowest cost.
* Largest Temp range.

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| Name | datasheet | Form Factor | Max A | Quality | Control voltage | Control current | R | Temp Range | cost |
| CMX | [Link](http://www.crydom.com/en/products/catalog/cmx-series-dc-pcb-mount.pdf) | Skinny (7.6 x 43.1 x 25.4) | 10 | Mosfet output | 3-10 | 15mA @5v | .018 | -30 to 80 | 43.83 |
| GN | [Link](http://www.crydom.com/en/products/catalog/gn-series-dc-panel-mount.pdf) | Puck (44.5 x 47.6 x 22.6) | 10 | Aluminum base with | 3-32 | 14.5 | N/A?  Current reg? | -40 to 100 | 47.92 |
| MCMX | [Link](http://www.crydom.com/en/products/catalog/mcmx-series-dc-pcb-mount.pdf) | Skinny (10.2 x 43.1 x 25.4) | 10 | Thermally conductive epoxy body. (mosfet output) | 3-10 | 15mA @5v | .018 | -40 to 80 | 44.17 |
| CPC | [Link](http://www.ixysic.com/home/pdfs.nsf/www/CPC1709.pdf/$file/CPC1709.pdf) | Skinny Lays flat (5.026 x 26.16 x 19.9) | 22.8 with heat sink 9w/o | Mosfet output | 1.2 (exactly?) | 10mA | .05 | -40 to 100 | 6.88 |
| 710FR | [Link](http://www.irf.com/product-info/datasheets/data/rdha710fr10a1nx.pdf) | Flat (16.3 x 10.79x 4.953 ) | 10A | RAD HARD 100krad | 1 | 10mA | .018 | -55 to 125 | Contact Infinion |
| 720SF | [Link](http://www.irf.com/product-info/datasheets/data/rdha720sf06a1nk.pdf) | Flat (14.97 x 22.6 x 6.85) | 20A | RAD HARD 100krad | 5.2? | 20mA | .045 | -55 to 125 | Contact Infinion |