

## Integrated Reconfigurable Driver for Cryogenic Space Applications

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### Abstract

This paper presents an integrated reconfigurable driver for cryogenic space applications. The driver supports DC motors, stepper motors, and solenoid actuators. NASA's space exploration roadmap calls for returning man to the moon between 2015 to 2020. Electronic components that reliably operate under lunar temperature swings (-180C to +125C) without thermal protection are required. The reconfigurable option of this driver would enable a single spare to fulfil multiple electronic functions. This will offer redundancy and reduction in flight spare inventories for long duration missions. This driver will be microcontroller based and

fabricated using radiation hardened IBM silicon germanium (SiGe) BiCMOS 5AM technology. Testing will be done using cryogenic chambers to ensure operation and reliability at ambient conditions on the surface of the Moon without thermal protection. It will be applicable to lunar rovers, robotics, in-situ sampling instrumentation, life support systems, and spacecraft instrument (spectrometers) positioning.

**Keywords:** Reconfigurable driver for space, DC motor driver, stepper motor driver, extreme space electronics