

CubeSat Interface Standard Draft and Project Update

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CubeSats are often built with emphasis on low-cost and fast-delivery. The low-cost can be achieved by extensive use of non-space-qualified commercial-off-the-shelf parts and units. The fast-delivery is, however, often difficult to achieve when the interface of different units, such as printed circuit board (PCB), do not match each other. The incompatibility can cause significant delay in the satellite project, leading to the loss of business opportunity or academic/technology competition.

There is also increasing trend that a CubeSat platform that contains all the satellite bus functionalities by a single vendor is combined with a mission payload. If there is a common standard on the interface between the CubeSat platform and the mission payload, it will broaden the choice for those who want to do a space mission but not want to build a satellite to select the platform depending on their needs. The standard will make it easier for CubeSat vendors to enter the market of CubeSat platforms.

In 2019, a new project to standardize the CubeSat interface started with participations of worldwide CubeSat developers and vendors. After going through a series of meetings, now a standard draft is ready to be submitted to ISO (International Standard Organization) for registration as a New Work Item.

The draft standard document describes internal and external interface of CubeSat. The document is made of eight chapters. In the fifth chapter, the document lists the requirements for unit (i.e. component) to unit interface. After providing general requirements, it deals with the PC-104 style and the backplane style. The document then describes the requirements for mission payload to platform (i.e. bus) interface. In the sixth chapter, the document lists the datasheet requirements for CubeSat units. The purpose is to ease the production selection process, satellite integration and testing. In the seventh chapter, the document lists the datasheet requirement for CubeSat platform, which basically can serve as the interface control document. In the eight chapter, the document lists the requirements for the external electrical interface, i.e. umbilical.

Foreword Standard draft: Table of contents

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Scope

This document describes internal and external interface of CubeSat. The internal interface includes the interface between components and the interface between a CubeSat platform and a mission payload. The document also describes the items to be included in the datasheet of the CubeSat components and platforms. The datasheet requirements apply to catalogued commercial products ready for sale. The interface between CubeSat and its deployer, i.e. POD, is not included in the scope.

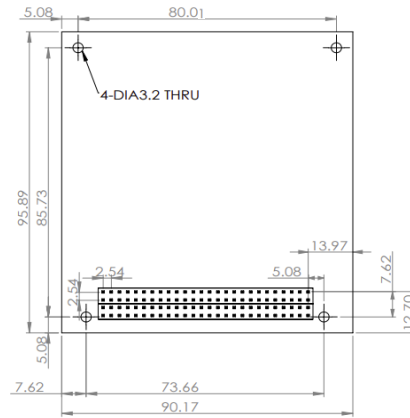


Figure 1. PC-104 Style Unit

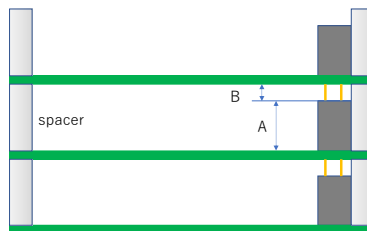


Figure 2 - PC-104 Style stacking condition (A=11.05mm)

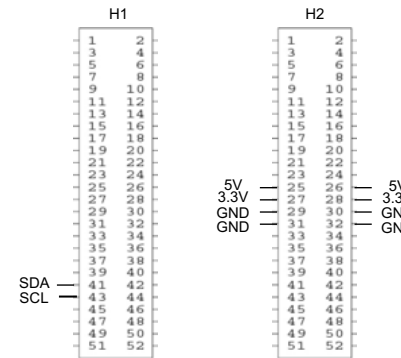


Figure 3 - PC-104 Style pin assignment

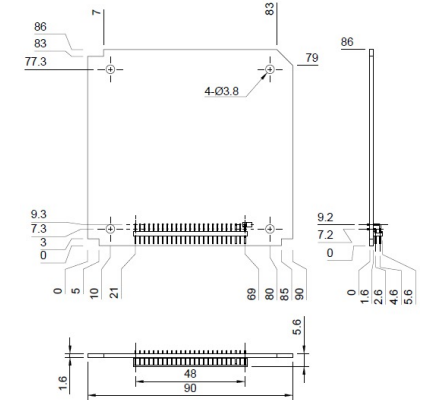


Figure C.2 – Example of PCB size requirement for backplane style

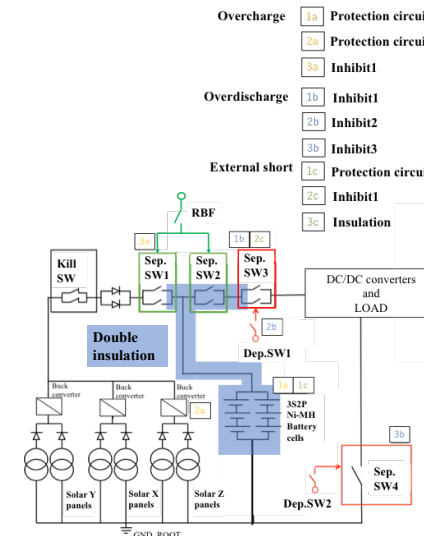


Figure 4 – Example of EPS block diagram to be used for safety review

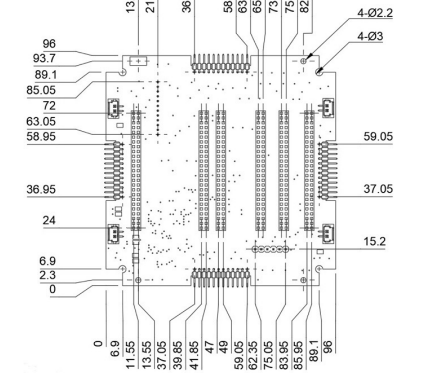


Figure C.4 – Example of connector requirements on BPB