

System and Subsystems

As mentioned in the introduction, when designing the PCBs of the respective boards, one also needs to design a system to effectively insert these inside the housing. The main system for this essentially works as a two layered shelf that slides into the Rover, thus allowing one to take it in and out with ease if needed. Each level has space for 4 nuclei boards (8 in total), each stored in their respective PCB, and one Nvidia processor that is placed at the end, as it's PCB requires more space than the others. In the following section, the different components of this system will be further discussed. Before beginning with this, it is useful to create a clear list of requirements used for the design:

- PCBs need to properly stay in place when Rover is functioning.
- The cables coming out of the PCBs need to be able to connect to their respective components in the Rover.
- Both the individual PCBs, and the entire storage system need to be easily accessed in case anything needs to be altered.

The system needs to be protected for any outdoor contamination while performing missions, but the space also needs to be left accessible.

PICTURE OF STRUCTURE ASSEMBLY

PCBs

The PCB designs for the boards need to be made such that these stay in place to avoid any slight movement such that no components of the board gets accidentally disconnected, or falls. For this, a tight fit was made such that the board can be fitted inside the box by simply pushing it inside, knowing it is properly in after hearing a click, giving a tolerance of (). For reference of the shape and dimensions of box, the following sites were consulted (link). While at first a lid was considered for these boxes, because if the fit is precise enough the board will stay in place and not move, it was decided that the covers for the boxes were not necessary. At the sides of the cases, holes are appropriately placed such that the required cables can exit. The design of the PCB follows the same idea, with just the dimensions changing and where the cable exits are located, but these PCBs now need to be stored inside the housing. Given that these need to be easily accessible so that the cables can be dealt with, a sliding mechanism was used. This would work like sliding a drawer in and out, but in a vertical position instead of a horizontal. This system will be further explained later on, but it is also important to explain how the PCB is compatible with the system briefly described in the introduction. A railing is installed at the top and bottom of the PCBs, and so like this they can fit with their counterpart found in the storage system.

PLACE SIDE BY SIDE PHOTOS OF THE PCBs SHOWING WHERE EACH PART IS FOUND

STORAGE SYSTEM

The storage system for the PCBs is found inside the housing, containing two levels for the PCBs, 4 in each row and 8 in total, and one slot at the side for the Nvidia processor PCB. The beginning and end of this storage is marked by the walls at the sides connected by 6 equally spaced bars, 3 at the front and 3 at the back. The bars provide the counterparts for the railings that allow the PCBs to slide in, the fit having a tolerance of (). Given that the Nvidia processor is bigger than the nuclei boards, it doesn't fit in either level due to their heights, and thus this is placed individually at the right end.

PICTURE OF STORAGE SYSTEM WITHOUT THE PCBs

ATTACHMENT SYSTEM

The storage system has to be attached to the housing with the use of a sliding mechanism, similar to that used for the PCBs, but with a different geometry. The storage system is slid in thanks to 2 attachments at the top of the part of the housing, and another on the left wall. This is enough to allow for the proper attachment of the storage system, without needing to add anything at the right side, allowing for cables to pass through in this extra space.

PICTURE SHOWING HOW THE ATTACHMENT WORKS AND LABEL EACH PART

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