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Refinements and Printing of the Light Emitting Diode Box
for Hall A's Large Area Picosecond Photodetector Test Stand

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This note presents refinements made to the NX-generated 3D model of the light emitting diode (LED) box for testing of Hall A's Large Area Picosecond Photodetector (LAPPD) and the printing thereof.

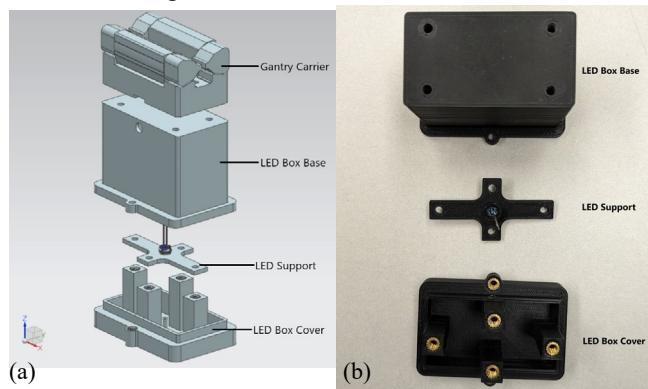The LED box for testing the LAPPD has a base, a support, and a cover, Fig. 1.

FIG. 1. (a) NX model of LED box, (b) 3D-printed parts.

The initial design [1] was refined so that the LED could be accessed to replace it, without having to disassemble the box from the gantry carrier. In this design, the cover can be removed by loosening the thumb screws that attach the cover to the base. The support's platform has been relocated from the base to the cover.

Hole sizes and locations were changed. Bronze insert threads were used, providing a more accurate thread diameter and pitch than those generated by the 3D printer. The insert threads were installed into the LED cover by pre-heating the

insert thread tip tool with a standard soldering tip and then by pushing the thread into the insert hole to the depth limit, Fig. 2.

The thickness of the support was reduced to allow installation of the LED holder (Digikey part number 516-1394-ND), which comprises a plastic mounting clip and a retaining ring to hold a 5-mm blue LED (Digikey part number 67-1751-ND).

The base was redesigned to accommodate the LED cable in the less than 2-mm space available between the base and the gantry carrier. Two holes in the base were modified for the M4 bolts to attach to the cover.

The model was 3D-printed with an Ultimaker S7 3D printer, which is compatible with the STL files exported from NX. Cura 5 software configured the 3D printer. Printing time depends on the thickness of each layer, supports used, and cell types. Because of the geometry of the base, proper printing required temporary supports, which were added by choosing the support option in the Cura software.

Inspection of the printed parts showed that the cover's 1-mm through-hole for the optical fiber was filled with residual filament. The residual filament was removed, after which the optical fiber was inserted in the through-hole.

The LED box model design has been printed.

[1] P. Campero, et al., *Light Emitting Diode Box Design for Hall A's Large Area Picosecond Photodetector Test Stand,* Note 2024-12, 2024.
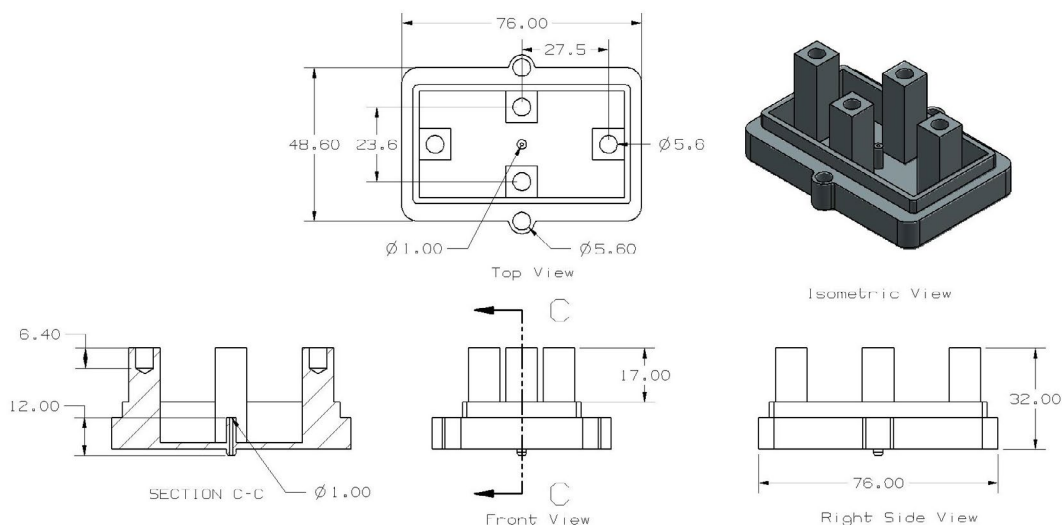
FIG. 2. Isometric, 3rd angle projections, and sectioned view of LED box in NX. Dimensions are in mm.