Making shields around table-mounted optical assemblies

1. Introduction

Optical assemblies often need to be placed in some form of semi-permanent enclosure for all sorts of reasons: eliminating light from sensitive detectors, ensure that no unwanted beams find their way to personel or quite simply to prevent inadvertent 'tweaking' by people who have nothing better to do! We describe here a simple system which can be put together at far lower cost than when used 'purpose made' components.

2. Construction

The basic approach is to use readily available aluminium extrusions, available in a 20 x 20 mm cross-section, in conjunction with optical blackout boards which can be easily cut to size with a sharp knife. There are several suppliers of black 'foam' boards, but the 600 x 600 x 5 mm TB4 boards available from Thorlabs (http://www.thorlabs.com/) are very convenient. If you need to make shields regularly, a more cost-effective solution is to buy in bulk (e.g. http://www.graphicsdirect.co.uk/ FBA05BB (A0 size), FBA1BB5MM (A1 size) or FBA2BB5MM (A2 size)). These boards are compatible with readily available extrusions with a 6 mm 'gap' as shown in Figure 1; such extrusions are available from RS (Stock No. 466-7219, Bosch Rexroth Part 3842517173), http://uk.rs-online.com/ or in bulk from Bosch Rexroth (http://www13.boschrexroth-us.com/Framing_Shop/Product/Default.aspx?category=10101, as part 3842517179 in packets of 20.

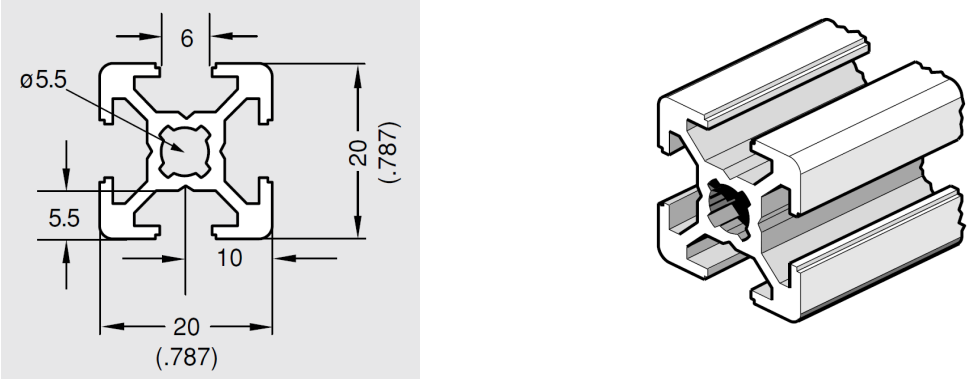

Figure 1. Details of the aluminium extrusion used in construction of the optical shields.

Although there are numerous versions of this type of extrusion available (e.g. with 6 mm gaps only on selected sides) and various 'corner' pieces to enhance appearance, we stick to the 4-gap version for simplicity of construction and so as to minimize workshop stock.

All that is needed is to cut the sections to the required lengths and to drill a few holes, as shown in Figure 2. The basic idea is to mount horizontal pieces to the optical table (if required) using bolts 'hidden' in the extrusion, while the vertical pieces attach to the horizontals using bolts accessed through 6 mm diameter holes drilled 10 mm from the edge of the vertical piece.

The blackout sheets are cut larger than the framework (+11 mm horizontal, +5.5 mm vertical) and then slid into the assembly. The top surface can be finished of with an anodised aluminium sheet screwed into the 'open' verticals. Alternatively, a similar construction can be made for the top cover, i.e. with a framework at the top. In this instance, drill the holes closer to the edge and finish off with 'end-plugs' for the verticals. We prefer the simplicity of the former approach!

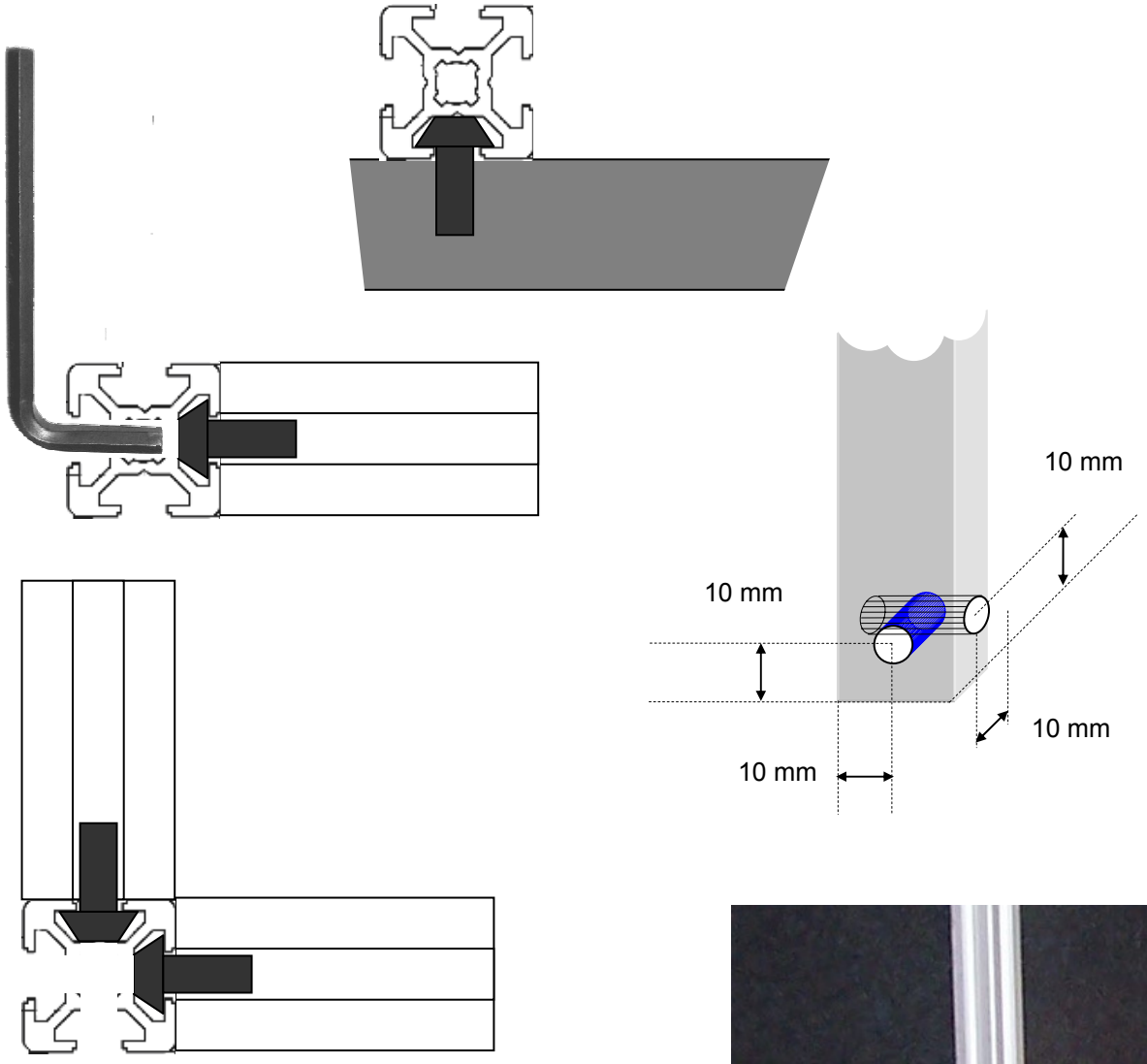

Figure 2. Construction of the shield framework and the finished construction (left).

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